

**Fishery Data Series No. 10-83**

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# **Unalakleet River Salmon Studies, 2002–2008.**

by

**Scott Kent**

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December 2010

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



## Symbols and Abbreviations

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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code		<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL		AAC		
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H <sub>A</sub>
hectare	ha			base of natural logarithm	<i>e</i>
kilogram	kg	all commonly accepted		catch per unit effort	CPUE
kilometer	km	professional titles	e.g., Dr., Ph.D., R.N., etc.	coefficient of variation	CV
liter	L			common test statistics	(F, t, $\chi^2$ , etc.)
meter	m	at	@	confidence interval	CI
milliliter	mL	compass directions:		correlation coefficient (multiple)	R
millimeter	mm	east	E	correlation coefficient (simple)	r
<b>Weights and measures (English)</b>		north	N	covariance	cov
cubic feet per second	ft <sup>3</sup> /s	south	S	degree (angular )	°
foot	ft	west	W	degrees of freedom	df
gallon	gal	copyright	©	expected value	<i>E</i>
inch	in	corporate suffixes:		greater than	>
mile	mi	Company	Co.	greater than or equal to	≥
nautical mile	nmi	Corporation	Corp.	harvest per unit effort	HPUE
ounce	oz	Incorporated	Inc.	less than	<
pound	lb	Limited	Ltd.	less than or equal to	≤
quart	qt	District of Columbia	D.C.	logarithm (natural)	ln
yard	yd	et alii (and others)	et al.	logarithm (base 10)	log
		et cetera (and so forth)	etc.	logarithm (specify base)	log <sub>2</sub> , etc.
<b>Time and temperature</b>		exempli gratia		minute (angular)	'
day	d	(for example)	e.g.	not significant	NS
degrees Celsius	°C	Federal Information Code	FIC	null hypothesis	H <sub>0</sub>
degrees Fahrenheit	°F	id est (that is)	i.e.	percent	%
degrees kelvin	K	latitude or longitude	lat. or long.	probability	P
hour	h	monetary symbols		probability of a type I error	
minute	min	(U.S.)	\$, ¢	(rejection of the null hypothesis when true)	$\alpha$
second	s	months (tables and figures): first three letters	Jan.,...,Dec	probability of a type II error	
<b>Physics and chemistry</b>		registered trademark	®	(acceptance of the null hypothesis when false)	$\beta$
all atomic symbols		trademark	™	second (angular)	"
alternating current	AC	United States		standard deviation	SD
ampere	A	(adjective)	U.S.	standard error	SE
calorie	cal	United States of America (noun)	USA	variance	
direct current	DC	U.S.C.	United States Code	population sample	Var var
hertz	Hz	U.S. state	use two-letter abbreviations (e.g., AK, WA)		
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

***FISHERY DATA SERIES NO. 10-83***

**UNALAKLEET RIVER SALMON STUDIES, 2002–2008**

by

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Alaska Department of Fish and Game, Division of Commercial Fisheries, Nome

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Division of Sport Fish, Research and Technical Services  
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# ABSTRACT

Unalakleet River salmon abundance was evaluated using test fishing with set gillnets, North River tower counts, and inseason subsistence surveys. This report summarizes the Unalakleet River 2002–2008 test net project results, and the North River tower 2005–2008 enumeration project results. Aerial survey indices, subsistence, and commercial harvest data are presented for historical comparison. Catch, age, and escapement data are discussed collectively in a stock assessment summary section for each species.

Unalakleet River Test Net: Chinook salmon *Oncorhynchus tshawytscha*, catches ranged from 25 fish (2003), the second lowest on record, to the fourth highest catch of 123 fish (2008). Test fishery catches of chum salmon *O. keta*, ranged from the second lowest catch of 458 fish (2003) to a record catch of 1,931 fish (2008). Pink salmon *O. gorbuscha*, catches for odd and even-numbered year runs were well above the long-term average catch of 944 fish from 2002 to 2008, including a record 7,599 fish caught in 2006. Coho salmon *O. kisutch*, test fishery catches were average in 2003, but above the long-term average catch of 257 fish from 2004 to 2008.

North River Counting Tower: Below average Chinook salmon passage estimates occurred in 2005, 2006 and 2008, including a record low count of 903 fish in 2008. Chum salmon passage at North River tower was above the long-term average passage of 5,451 fish in 2005, 2007, and 2008. North River pink salmon passage from 2005 to 2007 was above the odd (120,467 fish) and even-year (392,772 fish) averages, including a record count of 2,169,890 fish in 2006, but a below average even-year count of 241,798 fish occurred in 2008. Coho salmon tower counts were well above the previous 4-year (2005–2008) average passage estimate of 6,495 fish, including a record count of 19,944 fish in 2007.

Key words: Chinook salmon, *Oncorhynchus* test fishery, Unalakleet Subdistrict, Unalakleet River, Catch per unit effort

# INTRODUCTION

## BACKGROUND

The Unalakleet River drainage encompasses 5,400 square km and extends westward from the Nulato Hills for approximately 210 km to the Bering Sea (Figure 1). The Unalakleet River and its 5 major tributaries support returns of all 5 species of Pacific salmon (*Oncorhynchus* spp.). The Unalakleet River is the largest producer of salmon in the Norton Sound District with the Unalakleet Subdistrict (Subdistrict 6) accounting for approximately 40% of total salmon harvests (Jim Menard, Commercial Fisheries Biologist, ADF&G, Nome; personal communication). The town of Unalakleet is situated at the mouth of the river and historically residents of Unalakleet have depended on salmon runs as the basis of their cash economy and subsistence needs.

Methods for monitoring salmon escapements in the Unalakleet River watershed have included side-scan sonar, test fisheries, tower counts, and aerial surveys. Test fisheries have been conducted by Alaska Department of Fish and Game (ADF&G) since 1981 (Bue and Lean 1988, 1990; Bue 1994–1995; Kohler 2000b, 2001b, 2002b; Lean and Peterson 1982–1985; Lean 1985b, 1986b, 1987b, 1989, 1991; Rob 1996a–b, 1997b, 1998b, 1999b). Since the inception of test fisheries personnel have conducted inseason subsistence surveys and collected age, sex, and length (ASL) data from the Unalakleet Subdistrict commercial catch. Inseason subsistence surveys have provided fishery managers with an early index of Chinook salmon (*O. tshawytscha*) relative abundance and run timing. Additionally, in recent years, test fishery personnel have collected ASL data from Chinook salmon harvested in the Unalakleet Subdistrict subsistence fishery and from the escapement by capturing fish using beach seines. An enumeration tower was operated on the North River, the largest salmon spawning tributary of the Unalakleet River, by ADF&G intermittently from 1972 to 1986, Kawerak Inc. from 1996 to 2001, and the Native Village of Unalakleet (NVU) from 2002 to 2007 (Lean 1985a, 1986a, 1987a; Regnart and Trasky

1973). Since 2006, NVU have received funding assistance for the tower from Norton Sound Economic Development Corporation (NSEDCC). Aerial surveys are conducted on the North River, Old Woman River, and upper mainstem of the Unalakleet River. Although not used for inseason management, aerial surveys provide comparisons with test net catches, tower counts, and historical aerial survey data. Aerial surveys are rated as reliable or “complete” escapement indices if they are conducted under good viewing conditions and coincide with peak spawning periods for each salmon species (Estensen and Evenson 2006).

This report presents findings from the Unalakleet River 2002–2008 test net project and results from the North River 2005–2008 counting tower project. Results from ancillary Chinook salmon stock assessment projects operated by the test fishery crew are also presented as subsections within the test fishery sections. Results from all projects, as well as aerial survey data are summarized and interpreted with the historical data by species.

## **UNALAKLEET RIVER TEST FISHERY**

Test fishing in the Unalakleet River has been conducted by ADF&G since 1981, but varying test fishing and data collection methods were used prior to 1985. During the 1981–1983 seasons, variable mesh gillnets were fished at multiple sites in an attempt to apportion side-scan sonar passage (Lean and Peterson 1982, 1983, 1984). However, hydroacoustic counting techniques were abandoned following the 1983 season due to difficulties with species apportionment. Fishery managers spent the 1984 field season test fishing with drift gillnets, beach seines, and set gillnets. Area staff determined that set gillnets were least affected by fluctuating water levels, turbidity, and other variables (i.e., Chinook and coho salmon were more successful at evading beach seine and drift gillnet gear) (Lean and Peterson 1985). Since 1985, ADF&G has conducted test fishing operations exclusively with set gillnets comprising 5<sup>7</sup>/<sub>8</sub>-inch (14.9 cm) stretched mesh.

Test fishery catches and catch per unit effort (CPUE) are compared to commercial fishery CPUE and other comparative catch statistics inseason and with data from previous years. Whenever possible, ASL data have been collected from chum (*O. keta*), coho (*O. kisutch*) and Chinook salmon from both the test and commercial fisheries to allow for comparisons and to make projections regarding future returns.

The Unalakleet River test net project is primarily used for chum and coho salmon stock assessment; although a small number of sockeye salmon (*O. nerka*) are captured. Pink salmon (*O. gorbuscha*) are also caught in the test net, but the catch is comprised mostly of males with developed humps whereas females are less likely to be caught in the 5<sup>7</sup>/<sub>8</sub>-inch mesh.

## **CHINOOK SALMON STOCK ASSESSMENT**

Unalakleet River Chinook salmon runs have declined precipitously since 2000. Escapement goals have only been reached once since 2003 despite early closures to Chinook salmon subsistence and sport fisheries in 5 of the previous 6 years. In response to the inability to meet escapements despite restrictive measures, Unalakleet River Chinook salmon was designated as a stock of yield concern in 2004 by the Alaska Board of Fisheries (BOF) (Kent and Bergstrom 2006). A stock of yield concern is defined as “a concern arising from a chronic inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above a stock’s escapement needs; a yield concern is less severe than a management concern” (5 AAC 39.222(f)(42)). The BOF continued this designation in 2007, and in an effort to further

conserve Chinook salmon and restore the stock to historical yield levels, adopted a new management plan (5 AAC 04.395) that incorporates a more restrictive subsistence fishing schedule and a 50% reduction in daily and annual sport fish bag limits. Prior to 2007, subsistence fishing was open continuously in the marine waters and inriver subsistence fishing was only closed for 36 hours a week. For fish 20 inches or greater in length, the daily bag limit was 2 and the annual possession limit was 4 in the sport fishery. Under the newly adopted plan, subsistence fishing from June 15 to July 15 in the Unalakleet Subdistrict is limited to two 48-hour periods per week in the marine waters, and two 36-hour periods per week in the Unalakleet River. Similarly, the sport fish bag limit for Chinook salmon 20 inches or greater was reduced to one Chinook salmon per day with an annual harvest limit of 2 in the Unalakleet River. The intent of 5 AAC 04.395 was to enhance Chinook salmon escapements by providing escapement windows between subsistence fishing periods and reducing subsistence and sport fish harvests.

### **Subsistence Fishery Background and Inseason Surveys**

In contrast to the 5 $\frac{7}{8}$ -inch test fishery gear, subsistence fishermen typically deploy gillnets fabricated with 8-inch (20.3 cm) stretched mesh that measure 50 fathoms in length in the marine waters, and 15–20 fathoms in length in the lower Unalakleet River. Large-mesh gillnets target predominantly 5-year old and older Chinook salmon that comprise the majority of Chinook salmon runs. Consequently, fishery managers consider inseason subsistence catch data to be a better indicator of run strength than test nets

Inseason Chinook salmon subsistence catch data have been collected by ADF&G since 1982 (Bue 1995; Bue and Lean 1988, 1990; Kohler 2000a, 2001a, 2002a; Lean 1986b, 1987b). Prior to 2007, inseason survey data were only collected from a select group of cooperative Chinook salmon subsistence harvesters in Unalakleet. Since 2007, the test fishery crew has made a concerted effort to interview all active fishermen inseason in an effort to more accurately monitor the subsistence harvest. This provides fishery managers with timely and accurate inseason assessments of Unalakleet River Chinook salmon run strength and timing. Changes in subsistence catches and catch rates, for example, can help determine if additional restrictive actions (i.e., early closures) are necessary in order to reach the North River tower-based sustainable escapement goal (SEG).

The importance of the inseason survey as a management tool has been elevated in recent years. Chinook salmon will often mill in the lower Unalakleet River for several days before actively migrating upstream to spawning areas. Generally, surges in the lower Unalakleet River subsistence catches are followed by commensurate pulses in Chinook salmon passage at the North River tower 7–10 days later (Fred Bue, Commercial Fisheries Biologist, personal communication). Historical inseason subsistence and commercial catch data indicate that Chinook salmon catches peak in the marine waters between June 22 and June 27. By comparison, the first major pulse of Chinook salmon is usually not detected at the North River tower until the second week of July. If more restrictions are necessary to meet escapement needs, it is necessary to take management actions in the subsistence and sport fisheries by early July. For this reason, subsistence catches and tower counts are evaluated collectively in late June and early July to determine if additional restrictions and/or closures are needed.

### **Chinook Salmon ASL Sampling**

Since 1985, the majority of Chinook salmon age data have been collected from test and commercial fisheries. However, directed commercial fishing for Chinook salmon has not

occurred since 2005 and in only 2 years since 2000, thereby eliminating a source of age class data. Additionally, Estensen and Evenson (2006) suggested that the historical Chinook salmon ASL data may contain inaccuracies based on disparities in annual sample sizes and gillnet mesh-size selectivity biases. Limited age class information regarding Unalakleet River Chinook salmon combined with its stock of concern status underscore the importance of obtaining good quality age class data that is more representative of the run. As a result ADF&G began a more intensive sampling approach in 2007. Since 2007, age class data have been collected from marine and inriver subsistence fisheries, as well as from spawning escapement in the mainstem of the Unalakleet River. In the short term, collecting ASL data from the subsistence fishery and spawning escapement is useful for making qualitative projections about future Chinook salmon returns. In the long term, such data would contribute to building brood tables and developing escapement goals. Collecting these data may also reveal changes in age and size structure of the catches.

## **NORTH RIVER COUNTING TOWER**

The North River is the largest of the 5 major salmon tributaries in the Unalakleet River drainage. Radiotelemetry studies have shown that approximately 13% of the chum salmon (Estensen and Hamazaki 2007; Estensen et al. 2006), 12% of the coho salmon (Joy and Reed 2007), and 39% of the Chinook salmon (Wuttig 1998, 1999) returning to the Unalakleet River drainage spawn in the North River.

ADF&G operated the tower from 1972 to 1974, and again from 1984 to 1986 (Lean 1985a, 1986a, 1987a; Regnart and Trasky 1973). However, the project was discontinued in 1987 due to a lack of funding. Kawerak Inc. resumed tower operations from 1996 to 2001 (Kohler 2000a, 2001a, 2002a; Rob 1997a, 1998a, 1999a) and NVU has operated the project since 2002 (Jones 2006). During the 2007–2008 seasons, ADF&G personnel conducted tower operations from mid June until early July, at which point the project was transitioned to NVU personnel who operated the tower until mid September. NVU operations during the 2002–2008 seasons were supported with funding assistance from Bering Sea Fishermen’s Association (BSFA) and NSEDC.

In contrast to the Unalakleet River test net project, the primary purpose of the North River tower project is to obtain an accurate estimate of the escapement of Chinook salmon. Radiotelemetry investigations suggest that the proportion of Chinook salmon that return to the Unalakleet River drainage that spawn in the North River remained relatively consistent over a 2-year period at 37.2% and 40.1% for 1997 and 1998, respectively (Wuttig 1998 and 1999). Assuming these proportions are relatively consistent on an annual basis, the North River tower Chinook salmon count is thought to provide a reliable index of drainagewide escapement. There has been a tower-based escapement goal for Chinook salmon on North River since 1999. From 1999 to 2003, it was an escapement goal range of 1,200–2,400 (Fair et al. 1999). In 2004, the goal was reviewed and revised to an SEG range of 1,200–2,600 Chinook salmon (Brannian et al. 2006).

From 1984 to 1986, the North River tower project was conducted at various sites several kilometers upstream from the confluence of the Unalakleet River. The project was discontinued in 1987 because of a lack of funding, and because the North River was not considered to be an important indicator of chum salmon abundance for the Unalakleet River drainage. Additionally, a decline of the chum salmon fishery occurred at this time that also contributed to the project’s low priority status. The project resumed operations in 1996, largely as a result of available funding and increasingly important Chinook, pink, and coho salmon commercial fisheries.

## **OBJECTIVES**

1. Estimate salmon abundance in Unalakleet River drainage using test net catch indices and escapement estimates from the North River counting tower.
2. Describe the run timing for salmon migrating into the Unalakleet River using test net catches and tower counts.
3. Describe the age, sex and length (ASL) composition of Chinook, chum and coho salmon from the test and commercial fisheries.
4. Describe and compare the Chinook salmon ASL composition of the escapement and subsistence fishery harvest (inriver and marine).

## **METHODS**

### **TEST FISHING**

Test fishing was conducted from early June through the first week of September. Since 1981, ADF&G has conducted test fishing operations at the same site, (GPS coordinates N 63° 51.930 W 160° 42.986) located on the north bank of the Unalakleet River approximately 5 km upstream from the river mouth (Figure 1). Consistent test fishing methods have been used since 1985 and this report provides comparisons with the historical data going back to 1985.

Gillnet gear consisted of a set gillnet with a 5 $\frac{7}{8}$ -inch stretch mesh size, measuring 20 fathoms (37 m) in length, and hung at a 2:1 ratio. Nets were constructed from light green #63 (210/18) multifilament, hung on braided  $\frac{1}{2}$ -inch nylon, cork lines with “Spongex” floats at 30-inch (76 cm) intervals, and braided 95 pounds (43 kg) per 100 feet (30 m) lead core lead line. The test net was set in a line between a willow that serves as an onshore anchor and the downstream end of an offshore island, effectively fishing the northern half of the channel between the island and the shore.

The test fishery project commenced operations as early as June 2 (2003–2004) and ended as late as September 14 (2006). From 2002 to 2005 and 2007–2008, test fishing occurred 7 days a week until the third Sunday of July, at which point the net was pulled every Saturday evening and redeployed the following Monday morning. In 2006, test fishing occurred 7 days a week throughout the season.

Crew members checked the net twice daily, except for those occasional days when it was picked more often to prevent fish or debris saturation. All fish caught in the test net were delivered to local residents for subsistence use. The crew maintains a list of local residents that want fish, but village elders are given priority when fish are distributed. Test net catches of each species and the hours fished were communicated to the ADF&G field office in Nome daily. Daily catches and time fished were then used to calculate CPUE for each species.

### **CHINOOK SALMON INSEASON SUBSISTENCE SURVEYS**

From 2002 to 2006, fishermen were interviewed daily from early June through mid July, but only a select group of fishermen were chosen for their reliability and willingness to report catch information. Mean daily catches were computed for both the inriver and marine subsistence fisheries from 2002 to 2006. Daily and cumulative catches were also compared with data collected from prior seasons. Reported catches are subject to inter-annual variability in the level

of survey participation, and therefore the survey data prior to 2007 is considered an underreporting of true harvest. Nevertheless, interviews from fishermen provided fishery managers with an early index of Chinook salmon run timing and magnitude during the 2002–2006 seasons.

From 2007 to 2008, nearly all residents in Unalakleet that were subsistence fishing for Chinook salmon were interviewed to obtain catch information. The subsistence fishing schedule stipulated in the Unalakleet River King Salmon Fishery Management Plan also provided fishery managers with more accurate soak time data. Accurate soak time data are necessary for calculating a subsistence fishery CPUE, a quantitative index of run strength irrespective of the level of survey participation. During the 2007–2008 seasons, catch data for each fisherman was entered into a Microsoft Excel<sup>1</sup> spreadsheet file that calculated the cumulative catch, average catch, and CPUE by period for both the inriver and marine fisheries. Subsistence fishery data were relayed daily to the ADF&G field office in Nome along with tower count and test net data.

## CHINOOK SALMON ESCAPEMENT CAPTURE METHODS

ASL data were collected in the mainstem of the Unalakleet River from Chinook salmon captured with beach seines during 2007–2008. ASL data collected with beach seines does not have the mesh-size selectivity bias associated with single-mesh gillnets. Furthermore, using beach seines reduces mortality and eliminates the arduous process of removing other salmonid bycatch. However, larger and more powerful Chinook salmon are capable of eluding capture by dislodging the lead line from the river bottom on some beach seines. In order to prevent large Chinook salmon from escaping and minimize sampling biases, a 30.5 m long by 2.1 m deep, 8.9 cm stretched mesh beach seine equipped with a braided 65 kg per 30 m lead core lead line was used. The heavier lead line appeared to be effective at preventing the large Chinook salmon from escaping, thereby providing a representative sample of the escapement's age structure with minimal impact to fish captured. However, some Chinook salmon may have been able to elude capture by swimming out of the seine before the net was enclosed.

Beach seining for Chinook salmon began during the 2007 season and was conducted from June 23 to July 14. From June 23 to July 3, seines were deployed at a site (GPS coordinates N 63° 51.6135 W 160° 42.3860) located approximately 2 km downstream from the outlet of the North River (Figure 1). This site was chosen because it had been successfully used to capture chum and coho salmon for several radiotelemetry projects (Estensen et al. 2005; Estensen and Hamazaki 2007; Estensen and Balland *In prep*; Joy and Reed 2007) and was determined to have favorable water depth and substrate for effective seining. It is also located upstream from where the majority of subsistence fishing effort occurs. However, this site was abandoned in early July because it yielded few Chinook salmon relative to the amount of seining effort.

From July 6 to 14, 2007, seining occurred at an alternative site (GPS coordinates N 63° 54.179 W 160° 24.909) located approximately 28 km upstream from the mouth of the Unalakleet River (Figure 1). Seining was much more productive at this site than the lower river site. Additionally, the channel at the upstream site had a consistent bottom profile free of large debris which minimized snags during seining events. Sampling excursions to this upstream site were done opportunistically, although seining was generally conducted every other day. During the 2008 season, beach seining was conducted exclusively at the second site from July 2 to 25. Prior to

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<sup>1</sup> Product names used in this report are included for scientific completeness, but do not constitute a product endorsement.

release, the adipose fin of each fish was clipped to prevent re-sampling during subsequent seining events.

## **SAMPLING GOALS AND ASL SAMPLING PROTOCOLS**

All Chinook, chum, and coho salmon captured in the test fishery were sampled for ASL data from 2002 to 2007. In 2008, the test fishery crew sampled all Chinook, but chum and coho salmon sampling goals were dropped to 480 and 200 samples, respectively. Annual chum and coho salmon sampling goals were further stratified into cumulative sampling goals by dates that corresponded with recent 5-year average test fishery run timing quartiles for each species. Sampling goals by quartiles were then divided by the number of work days leading up to the quartile date to determine how many chum or coho salmon per day were sampled by the crew. If the crew fell short of its daily sampling goal, they were instructed to make up the difference on the following day if there was surplus catch available to sample. From 2007 to 2008, the sampling goal was 300 Chinook salmon from the spawning escapement and 200 from the inriver and marine subsistence fisheries.

From 2002 to 2007, commercial catch ASL sampling goals included at least 150 coho and 250 chum salmon from the Unalakleet Subdistrict commercial fishery. However, crews sampled in proportion to the magnitude of the commercial catches and sampling occurred throughout the duration of the fishery. During the commercial coho fishery, scales were collected from catches during every period and the number of samples was proportional to the size of the catch. In 2008, the chum and coho salmon commercial sampling goals were to collect 20 and 10 samples per commercial period, respectively. Chinook salmon conservation concerns and/or lack of market interest resulted in the majority of chum salmon sampled being collected during the commercial coho salmon fisheries.

Salmon were measured to the nearest one-half centimeter from the mideye to tail fork (METF). The sex of each fish was determined by examining external characteristics (e.g., body symmetry, kype development, presence of an ovipositor) or by internal inspection of the gonads. To compensate for regenerated and unreadable scales, 3 scales were taken from each Chinook and coho salmon and 1 scale was taken from each chum salmon. Scales were collected from the left side of the fish approximately 2 rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Once cleaned, scales were mounted on gummed cards and impressions were later made in cellulose acetate cards with a hydraulic scale press for age determination (Clutter and Whitesel 1956). Impressions were later read with the aid of a microfiche reader and ages were determined from reading annuli as described by Mosher (1969). European notation was used to report ages in which the first digit refers to the freshwater age not including the year spent in the gravel and the second digit refers to the ocean age (Koo 1962).

## **NORTH RIVER COUNTING TOWER**

Since 1996, the North River tower has been located at the same site (GPS coordinates N 63° 53.168, W160° 39.484) located approximately 3 km upstream from the confluence with the Unalakleet River (Figure 1). A tower or scaffold made of aluminum was placed on the bank next to the river, on which an observer sits or stands in order to count fish. Towers were stabilized by attaching guy wires in the form of cable and/or nylon rope from the tower to trees or duckbill earth anchors. As in previous years, a 1.5 m wide x 40 m long white flash panel was placed

across the river bottom perpendicular to the river and was anchored in place with sand bags and stakes. A flash panel provides a contrasting background to aid the identification and enumeration of passing fish. To count fish during darkness, lights were spaced evenly on a cable strung above the river and affixed to both towers. Either a 12-volt battery system or 120-volt generator system was used to provide power for lighting. Tower project crews enumerate fish passing both upstream and downstream during timed intervals.

Although the site has not changed since 1996, the counting operation and methodology has been modified and improved over the years. From 1996 to 2006, 30-minute counts were conducted at the top of the hour and expanded to the whole hour; count times two equals one hour (30 minute  $\times$  2=60 minute) from an aluminum tower located on the east bank. From 1996 to 2001, a partial weir was installed from the west bank toward mid channel for the purpose of diverting migrating fish over the flash panel for easy observation. The partial weir method was abandoned following the 2001 season as a consequence of frequent wide fluctuations in water levels and tower personnel spending a large percentage of their time towards weir repair. Beginning in 2002, a second tower was placed on the west bank in order to conduct half-panel counts when turbidity and high water levels precluded counting the entire river width from the east bank. During the 2002 to 2004 seasons, it was at the discretion of the crew leader when it was necessary to conduct counts from both banks (Jones 2006). However, no counts were conducted from the west bank during the 2002 to 2004 seasons, despite reported partial panel counts. Partial panel counts offer fishery managers little value as they cannot be interpolated and are not comparable with full panel counts.

During the 2005 to 2006 seasons, NVU continued the method of conducting 30-minute counts from the east bank and using the west bank tower as a contingency during bad weather. Like the 2002 to 2004 seasons, counts were performed solely from the east bank and partial panel counts were reported under fair to poor viewing conditions. After visiting the tower site during the 2006 season, ADF&G biologists concluded that the relatively long expanse of flash panel used at North River made accurate salmon speciation and enumeration difficult. In addition, the section of channel just offshore from west bank appeared to be where the majority of fish passed due to its relatively deep profile. Difficulties with species apportionment were especially apparent under less than ideal counting conditions, and when all 4 species of salmon were migrating concurrently.

Given the past problems with weir maintenance at North River, shortening the flash panel and using a diversionary weir was not a viable option for the 2007–2008 seasons. Instead, ADF&G and NVU staff came to a consensus that hourly counts should be conducted from both the east and west banks. During the 2007–2008 seasons, an orange buoy was anchored just upstream from the approximate mid panel point, effectively dividing the 40 m panel into two 20 m sections. The counting regimen consisted of one 10-minute count from each bank multiplied by 6 to expand for the entire hour. More specifically, for the first 10-minute count, only fish passing between the east bank and the offshore buoy were counted. For the second 10-minute count, only fish passing over the panel expanse from the camp side (west bank) to the mid panel buoy were enumerated. Total hourly passage estimates by species were the summation of these 2 half-panel counts (east bank 10-minute count  $\times$  6 + west bank 10-minute count  $\times$  6 = total hourly count) and hourly estimates were summed to obtain daily passage estimates. If all 10-minute counts for 24 hours each day are counted, further expansion was not necessary. Interpolation methods for missed counts are discussed in the data analysis section.



The North River was operated from June 17 to September 14 in 2005, June 18 to September 15 in 2006, from June 16 to September 5 in 2007, and from June 19 to September 13 in 2008. Limited funding during the 2005–2006 seasons led to 0800–1500 counts not being conducted on Saturdays throughout the season. In 2007 and 2008, these scheduled missed counts did not occur until August 11 and August 9, respectively. Other factors (e.g., high water events, boat motor problems, bears in camp) led to additional missed counts during the 2005–2008 seasons. In 2005, counts were missed from 1000 June 18 to 2300 June 21 and from 0000 to 0700 July 26. Hours not counted during the 2006 season were 1300 June 30 and from 1500 July 16 to 0700 July 17. In 2007, missed counts occurred from 1100 to 1500 August 4, 0700 August 7 to 1500 to August 9, and 0900 August 13 to 1500 August 17. During the 2008 season, counts were missed at 1800 July 2, 0300 July 11, 1100 to 1200 July 16, 1200 to 1500 August 31, and 1900 August 15. Partial panel counts reported during the 2005–2006 seasons were considered missed counts and interpolated.

## DATA ANALYSIS

Test fishery cumulative CPUE was calculated as cumulative catch divided by cumulative hours assuming 20 fathoms of net. All historical and current year test fish CPUE data were expanded to 20 fathom units after the 1994 season (Rob 1996a, 1996b, 1997b, 1998b, 1999b; Kohler 2000b, 2001b, 2002b). CPUE was calculated upon capture of the first Chinook salmon, and the tenth chum, coho, and pink salmon. To expand the test net data for days not fished, CPUE was computed by dividing by 2 the summation of the CPUEs from the first day before and first day after no fishing occurred.

Subsistence and commercial fishery CPUE indices,  $I$ , were calculated as follows:

$$I = C_i \div T_i \times N_i$$

where:

$C_i$  = number of salmon harvested during period  $i$

$T_i$  = total duration of fishing time for period  $i$  in hours

$N_i$  = total number of permits (commercial) or fishermen (subsistence) that fished during period  $i$

Inriver subsistence fishery CPUE was computed in 20 fathom units whereas marine subsistence fishery CPUE was calculated in 50 fathom units. Commercial fishery CPUE was calculated in 100 fathom units because fishermen generally deploy 2 shackles of gear in the commercial fishery.

For days in which tower counts did not occur, the preceding day's count for a particular hour was added to the following day's count for the same hour and the total was averaged. If 2 days of counts for a particular hour were missed, the 2 preceding day's counts for that hour and the following 2 day's counts for that same hour were added and the total was divided by 4; small adjustments were made to account for rounding to whole numbers.

## **RESULTS AND DISCUSSION**

### **CHINOOK SALMON**

#### **Test Fishery**

Chinook salmon test net catches from 2002 to 2008 were 44, 25, 29, 78, 79, 96, and 123 fish, respectively; corresponding CPUE values were 1.83, 1.00, 1.31, 3.25, 3.29, 4.00, and 5.13 index points, respectively (Tables 1–2; Figures 2–3; Appendices A1–A14). Test fishery catches in 2002 to 2004 were below the long-term (1985–2001) average catch of 79 fish; catches were average from 2005 to 2006, and above average from 2007 to 2008. Further, the 2003 and 2004 catches represented the second and third lowest, respectively whereas the 2007 and 2008 catches were the seventh and fourth highest since 1985.

Compared to larger mesh gillnets (i.e., 7.5- to 8-inch mesh), the test net's 5 $\frac{7}{8}$ -inch (14.9 cm) mesh is also considered to be relatively inefficient at catching 5-year old or older Chinook salmon ( $\geq 660$  mm) that comprise the majority of the returns. This contention is further supported by the observation that test net catches seldom correlate strongly with fish passage at the North River tower. Above average test fishery catches from 2007 to 2008 may be the result of strong contributions of age-1.2 Chinook salmon (Chinook salmon  $\leq 660$  mm) and/or reduced subsistence fishing effort caused by fishing schedules and early closures.

As in previous years, the test fishery provided useful information concerning Chinook salmon run timing. Midpoint dates for the 2002 and 2005 Chinook salmon test fishery were June 26 and June 23, respectively (Figure 2; Appendix A15). The 2003, 2004, 2006, 2007, and 2008 seasons had midpoint dates of June 29, July 1, June 30, June 29, and July 7, respectively (Figure 2; Appendix A15). The 2008 test fishery tied 1985 for having the fifth latest midpoint (July 7) in the project's history (Appendix A15). Catches peaked on June 27 in 2002, July 3 in 2003, June 10 in 2004, June 18–19 in 2005, July 13 in 2006, June 26 in 2007, and July 9 in 2008 (Appendices A1–A14).

#### **Subsistence Fishery and Harvest Surveys**

The total subsistence Chinook salmon harvests of 349 fish (inriver + marine) reported inseason in 2002 was below the long-term (1985–2001) average reported harvest of 469 fish (Table 3). Subsistence harvests were above average from 2003 to 2008 with 551, 1,320, 909, 1,687, 1,646, 1,070 fish respectively reported as harvested (Table 3). However, subsistence harvests collected inseason prior to 2006 are considered to be gross underestimates of the true harvest. This contention is supported by poor catch rates conveyed by subsistence fishermen since 2002, as well as dramatic declines in postseason survey subsistence harvest estimates during the 2002–2008 seasons. From 2002 to 2005, only a select group of Chinook salmon fishermen willing to share information were interviewed. For example, subsistence harvest estimates obtained from postseason surveys ranged from 37% to 74% below the long-term average postseason survey harvest estimate of 4,805 Chinook salmon and inseason harvests underestimated postseason survey harvest estimates by 53% (2004) to 88% (2002) during the 2002–2005 seasons (Table 3). Inseason survey participation increased substantially in 2006 and nearly all fishermen were incorporated into the survey during the 2007–2008 seasons. Increased participation in the inseason survey led to more accurate estimates that only underestimated harvest estimates obtained via postseason surveys by 22% in 2006, 1% in 2007, and 16% in 2008 (Table 3).

Subsistence fishing periods stipulated in the management plan limited fishing opportunity during 2007 and 2008. Not surprisingly, most fishermen soaked their gear throughout the duration of each period. Assuming that fishermen soaked their gear throughout each period, the bi-weekly 36-hour inriver and 48-hour marine subsistence fishing periods provided fishery managers with soak time information and subsistence fishery CPUEs. More importantly, it provided more reliable early assessments of Chinook salmon run strength and timing. In 2007, catches peaked in the marine subsistence fishery for the 48-hour period ending June 23 when 493 Chinook salmon were harvested by 25 fishermen for a CPUE of 0.41 (Figure 4). However, catches for the 2 subsequent periods dropped by nearly 50% from the June 23 catch for the same number of fishermen. Subsistence catches peaked a week later in the Unalakleet River for the 36-hour period ending June 30 when 126 Chinook salmon were caught by 15 fishermen for a CPUE of 0.23 (Figure 4). Similar patterns were observed in the marine fishery during the 2008 season, although the Chinook salmon run exhibited very late run timing and was much weaker than in 2007. In the marine subsistence fishery, catches peaked for the 48-hour period ending June 26 when 31 fishermen reported a harvest of 460 Chinook salmon for a CPUE of 0.31 (Figure 5). Despite similar fishing effort (28 fishermen), only 145 Chinook salmon were harvested during the following 48-hour period ending June 30 (Figure 5). Similar patterns of changes in catch rates were not observed in the inriver subsistence fishery in 2008. This may be due to mesh-size restrictions implemented on the Unalakleet River in late June. This effectively closed the inriver subsistence fishery down before the first major pulse of Chinook salmon entered the Unalakleet River. Basically, fishermen were not willing to fish with smaller mesh gear, which can still catch Chinook salmon but quite often has a large bycatch of chum and pink salmon as well. Even before restrictions went into effect, the majority of inriver fishermen deployed their gear in the marine waters in 2008 where large-mesh gillnets were still permitted. Perhaps fishermen abandoned the inriver fishery early in order to obtain fishing spots in the marine waters. Early closures occurred in the subsistence and sport fisheries during the 2003–2004 seasons in the Unalakleet River and in both the Unalakleet River and Unalakleet Subdistrict marine waters during the 2006–2008 seasons. Subsistence fishery catch and catch rate information, particularly during the 2007–2008 seasons, factored largely in decisions concerning the management of Unalakleet River Chinook salmon.

## **Commercial Fishery**

Available stock assessment information clearly showed that Chinook salmon runs were too weak to warrant directed commercial fishing during the 2002–2004 and 2006–2008 seasons. However, the 2005 Chinook salmon run exhibited early run strength, which initially suggested there was a surplus available for commercial harvest. Chinook salmon escapements were slightly above the recent 5-year average at the North River tower for late June. Two 24-hour commercial fishing periods were permitted on June 27 and June 29. Periods were kept brief in order to minimize the effect on the subsistence users and escapements, while also providing an additional early index of Chinook salmon run strength. However, catches were very weak with 9 fishermen harvesting 81 Chinook salmon during period 1 and 4 permit holders harvesting 20 Chinook salmon during period 2 (Table 4). The season total catch was 101 Chinook salmon for a CPUE of 0.58, the second lowest on record for years in which there was commercial salmon fishing directed at Chinook salmon (Table 2; Figure 6). In addition to poor commercial catches, escapements did not improve at the North River tower (Figure 7; Appendix A16). As a consequence, commercial salmon fishing was closed until late July.

## **North River Counting Tower**

Chinook salmon cumulative passage estimates at the North River tower did not meet the lower end of the tower-based SEG (1,200–2,600) range during the 2005–2006 and 2008 seasons (Tables 2 and 5; Figure 8). The 2 lowest escapements were recorded at the North River tower in 2006 (906) and 2008 (903). Escapement goals have only been reached 50% of the time since an escapement goal was established on the North River in 1999. Prior to 2007, when an estimated 1,948 Chinook salmon were counted at the tower, escapement goals had not been reached at the tower since 2003. The 2007 escapement also represented the second year in which the midpoint of the escapement goal range was surpassed since a goal was established (Figure 8).

Chinook salmon passage peaked at the tower on July 4 in 2005 (118 fish), July 2 in 2006 (96 fish), July 10 in 2007 (174 fish), and July 16 in 2008 (189 fish). Dates of mean cumulative Chinook salmon passage were July 6 in 2005, July 9 in 2006, July 12 in 2007, and July 15 in 2008 (Appendices A16–A19).

## **Age, Sex, and Length Analysis**

There were 43, 26, 30, 80, and 79 Chinook salmon ASL samples collected from the Unalakleet River test fishery during the 2002–2006 seasons, respectively. Additionally, 43 ASL samples were obtained from the brief Chinook salmon commercial fishery in 2005. Age-1.2 Chinook salmon represented between 4.3% (2002) and 75% (2005) of the samples collected from the test fishery from 2002 to 2006; age-1.2 also comprised 9.3% of 43 samples collected from the 2005 commercial fishery. The percentage of age-1.3 fish in the test fishery ranged from 10.3% (2005) to 73.9% (2003), and age-1.4 comprised between 3.0% (2006) and 30.4% (2004) during the 2002–2006 seasons. Females comprised 3.8% (2006) to 36.7% (2004) of the test fishery samples from 2002 to 2006; gender information was not collected from commercial samples in 2005. From 2002 to 2006, average lengths for males ranged from 596 mm (2005), a record low, to 687 mm (2003), whereas average lengths of females ranged from 776 mm (2005) to 852 mm (2002). Overall average length in 2005 was 615 mm, also a record low (Tables 6–11; Figure 9; Appendices B1–B2).

In 2007, ADF&G began collecting ASL data from all segments of the Chinook salmon run, including the Unalakleet Subdistrict marine subsistence fishery, inriver subsistence fishery, and by sampling the spawning escapement using beach seine catches. Age-1.2 dominated the catches in the test net (64.2%) and the seines (71.6%), whereas age-1.3 and age-1.4 combined for more than 78% of both the inriver and marine subsistence fisheries' samples (Tables 12–15; Figure 11). In 2007, sex ratios of the test fishery and seine samples were also skewed heavily towards males. Samples were 79.8% male in the test fishery and 89.1% male in the seine samples, whereas the sex composition of the inriver and marine subsistence fisheries was 41.3% female and 51.8% female, respectively (Tables 12–15; Figure 11). In 2008, there were considerable differences in age and sex composition among all sources of ASL data from the 2007 season. Age-1.3 and age-1.4 comprised the majority of samples, representing a combined 62.6% of the seine samples, 83.5% in the test fishery, 94.5% in the inriver subsistence fishery, and 100% in the marine subsistence fishery (Tables 16–19; Figure 12). The percentage of females also increased in 2008, representing 23.6% and 21.6% of the test fishery and upriver seine samples, respectively (Tables 16 and 19; Figure 14). Inriver subsistence fishery samples were 17% females (Table 17; Figure 12) compared to 43% in the marine subsistence fishery (Table 18; Figure 12; Appendix B2).

## Stock Assessment Summary

The test gillnet is not used heavily for inseason management of Unalakleet River Chinook salmon because of its  $\frac{3}{8}$ -inch mesh. However, poor catch rates occurred in the subsistence fishery from 2002 to 2008. Additionally, Chinook salmon passage from 2005 to 2008 at the North River tower was below the long-term (1984–1986 and 1996–2004) average passage estimate of 1,787 Chinook salmon (Table 5; Figure 8). North River tower Chinook salmon passage was below the lower end of the SEG range from 2005 to 2006 (Table 5; Figure 8). Chinook salmon escapement needs were satisfied in 2007 based on the North River escapement goal, as well as above average aerial survey counts of Chinook salmon in the North and Unalakleet rivers. In fact, 2007 was the first year in which the lower end of the combined Old Woman and Unalakleet Rivers aerial survey SEG range of 550–1,100 was surpassed since escapement goals were established in 1999 (Fair et al. 1999). However, it is doubtful that escapement needs would have been met without the restrictive subsistence fishing schedule and an early closure to the subsistence and sport fisheries. The 2008 Unalakleet River Chinook salmon run was much poorer than forecasted and a record-low North River tower passage estimate of 903 Chinook salmon occurred despite the restrictive fishing schedule and proactive mesh-size restrictions aimed at increasing escapements (Table 5; Figure 8). Similarly, the 2008 Chinook salmon subsistence harvest of 1,402 fish was the lowest since survey data collection methodologies became standardized in 1994 (Table 3).

Although the third best Chinook salmon test fishery catch occurred in 2008, it is most likely the result of major reductions in subsistence fishing effort due to mesh-size restrictions on the Unalakleet River. Test gillnet catches increased markedly several days after mesh-size restrictions went into effect on June 30, 2008 and the catch was comprised of predominantly 5-year old Chinook salmon (Figure 9; Appendix B1). More importantly, ASL data collected from both the test fishery and spawning escapement suggest mesh size restrictions were effective at conserving 5-year old and older Chinook salmon and allowing these individuals to reach spawning areas.

High percentages of age-1.2 Chinook salmon in the 2007 test fishery and escapement samples, and high percentages of age-1.3 Chinook salmon in the 2008 escapement and test fishery samples indicate relatively good survival for the 2003 brood year. These observations suggest that age-1.4 Chinook salmon from the 2003 brood year may comprise a large segment of the 2009 run. Conversely, a poor parent-year escapement in 2004 at North River tower in conjunction with the 2008 age data suggests that age-1.3 Chinook salmon may make a smaller contribution to the 2009 run. If so, the 2009 run is expected to be below average and mesh size restrictions may be necessary if adequate numbers of Chinook salmon are going to reach spawning areas.

Unalakleet Subdistrict Chinook salmon runs have been below expectations since 2000. Drainagewide escapements of Chinook salmon are estimated based on the average proportion (0.386) of North River Chinook salmon abundance determined via radiotelemetry (Wuttig 1999). Chinook salmon drainagewide escapement estimates averaged 3,055 Chinook salmon from 2004 to 2008, 36% below the long-term average (1985–1986, and 1996–2004) of 4,786 Chinook salmon (Table 20; Figure 13). Harvest declines during the last decade have been even more profound. Prior to 1994, subsistence harvest survey estimates were not expanded to include households that were not surveyed until 1994 (Kent and Bergstrom 2006). Subsistence harvest estimates for the 1984–1986 seasons are believed to underestimate the actual harvest for those

years. Therefore, in order to make meaningful comparisons with the historical data, the 1994–2001 average subsistence harvest of 3,041 was substituted for harvest survey estimates from the 1984 to 1986 seasons. The 2004–2008 average Unalakleet Subdistrict combined harvest (commercial + sport + subsistence) estimate of 2,482 Chinook salmon is only 33% of the long-term average (1984–1986, and 1996–2003) harvest estimate of 7,617 Chinook salmon (Table 20; Figure 13). Unalakleet River Chinook salmon total run size (drainagewide escapement + combined harvest) averaged 5,537 fish from 2004 to 2008, which is only 45% of the long-term average (1984–1986, 1996–2004) run size estimate of 12,403 fish (Table 20; Figure 13). Exploitation rates averaged 58% from 1984 to 2003 compared to 46% from 2004 to 2008 (Table 20; Figure 13). A record high exploitation rate of 83% occurred in 1985 when a record commercial harvest occurred, whereas a record low exploitation rate of 26.6% occurred in 2007, the first season of subsistence fishing schedules and early closures (Table 20).

Less than favorable ocean conditions in recent years may have contributed to poor run performance observed in Unalakleet River Chinook salmon in recent years. This argument is strengthened by similar declines observed in several western Alaska Chinook salmon stocks from 2006 to 2008. However, the diminished productivity of Unalakleet River Chinook salmon observed since 2000 cannot be attributed entirely to ocean conditions. One important factor limiting production may be major changes observed in the quality of the spawning escapement in the 2000s. An analysis of historical test fishery data shows a trend toward fewer, of the larger and potentially more fecund females belonging to older age classes being caught. From 1986–1999, test fishery samples averaged 71% combined 5- and 6-year old (ages -1.3, 2.2., 1.4, and 2.3 combined) Chinook salmon and were 43–50% female (Figure 14; Appendix B1). In contrast, test fishery samples since 2000 have only averaged 57% combined 5- and 6-year old fish and 20% female (Figure 14; Appendix B1). Moreover, the overall length of Chinook salmon caught in the test fishery also declined from a 1986–1999 average length of 728 mm to an average of 684 mm from 2000 to 2006 (Figure 15; Appendix B1).

The apparent change in Unalakleet River Chinook salmon age, sex, and size composition is of concern to fishery managers, especially in light of major declines in total run-size estimates. Findings from previous investigations suggest that fecundity is positively correlated with length in Chinook salmon (Beacham and Murray 1993; Healy and Heard 1984; Quinn et al. 2004), and that more northerly populations of Chinook salmon may exhibit relatively high fecundity (Healy and Heard 1984). Given the relationship between fecundity and body size, and the potentially adaptive significance of high fecundity in northern regions, major changes in the age and size structure of the escapement (i.e., fewer larger female Chinook salmon) could have lasting adverse impacts to Unalakleet Chinook salmon productivity. However, it is important to note that previously collected escapement and age class data may contain inaccuracies. Specifically, the historical ASL data set contains biases associated with gillnet mesh size selectivity and beach seining site selection. In addition, drainagewide escapement estimates are currently based on only 2 years of telemetry data collected over a decade ago. If the relative abundance of Chinook salmon in the North River has changed significantly since then, or varies considerably on an annual basis, drainagewide Chinook salmon escapement estimates based on North River tower counts may not be reliable. ADF&G Division of Sport Fish will be conducting a radiotelemetry project during the 2009–2010 seasons on the Unalakleet River to reevaluate the proportion of Chinook salmon that spawn in the North River. Uncertainties with the ASL and escapement data could be largely eliminated by installing and operating a floating resistance-board type weir on the mainstem of the Unalakleet River. Not only would the weir provide accurate estimates of

Chinook salmon escapement, but ASL data collected from weirs is considered to be the least biased. Reliable estimates of drainagewide Chinook salmon escapements and unbiased age class information are needed to perform recruit-per-spawner (R/S) analyses, which are in turn used to develop biological escapement goals (BEG). BEG ranges are levels of escapement that provide the greatest potential for attaining maximum sustained yield (MSY). Stock-specific length-fecundity and age-fecundity relationships for Unalakleet River Chinook salmon are also being examined. A floating weir would provide reliable and timely escapement and age class information that would allow fishery managers to make informed management decisions and build a data set that can be used to develop scientifically defensible escapement goals for the Unalakleet River. Improvements in the quality of escapement and age data that is collected, as well as stock-specific fecundity data will also provide opportunities to examine the effects of harvest practices and other factors on the quality of spawning escapement and productivity of Unalakleet River Chinook salmon.

## **CHUM SALMON**

### **Test Fishery**

Chum salmon test fishery catches and CPUE were below the long-term (1985–2001) average from 2002 and 2003; the 2003 catch of 458 was the second lowest catch since 1985 (Table 21; Figures 16–17). The 2004 chum salmon catch of 976 was above average but the cumulative CPUE of 41.67 was slightly below the average CPUE of 42.29 (Table 21; Figure 17). Catches were well above average from 2005 to 2007; the third best catch (1,482 chum salmon) occurred in 2006 and a record 1,931 chum salmon were caught in 2008, easily surpassing the previous record catch of 1,635 in 1996 (Table 21). The 111 chum salmon caught on July 16 in 2008 also established a new record for the largest daily catch (Appendix A13).

Chum salmon runs exhibited early run timing in 2002 and 2005. The midpoint of the run in 2006 occurred on June 30 and was the earliest on record (Figure 16; Appendices A9 and A15). Run timing of Unalakleet chum salmon was about average during the 2004, and 2007–2008 seasons. The historical average midpoint of the chum salmon test fishery is July 18 (Appendix A15). The 2003 test fishery midpoint of July 30 was tied with 1993 for the latest on record (Figure 16; Appendices A3 and A15). Dates of peak chum catches in the test fishery occurred as early as July 2 in 2002 and 2006, and as late as July 31 in 2003.

### **Commercial Fishery**

Test fishery catches during the 2002 and 2004–2008 seasons indicated that there was a surplus of chum salmon available for commercial harvest in the Unalakleet Subdistrict. Additionally, the incidental catch of chum salmon in the 2008 pink salmon fishery (4.5-inch mesh) was high despite limited effort (8–18 permit holders). However, there was little to no market interest in chum salmon during the 2002–2006 seasons, and Chinook salmon conservation concerns precluded the prosecution of a chum salmon fishery during the peak of the chum salmon run during the 2007 and 2008 seasons, as chum salmon co-migrate with Chinook salmon.

In 2007, there were two 24-hour chum salmon directed commercial fishing periods beginning on July 18 and July 20. However, coho salmon catches outnumbered the chum salmon catch 2 to 1 during both periods and ADF&G switched over to coho salmon management for the remainder of the season. There were a total of 11,788 chum salmon harvested in 2007, the third lowest for years in which there was directed chum salmon openings (Table 21; Figure 18). In 2008, 2,351

chum salmon were harvested during a 24-hour period directed at chum salmon beginning on July 17. As in 2007, the majority of chum salmon harvested in 2008 were caught during the commercial coho salmon fishery. The 2008 harvest of 17,648 chum salmon was the largest since 1995 (Table 21) and would have been much greater had the fishery commenced earlier in the season.

### **North River Counting Tower**

Chum salmon migration by the tower site began shortly after the tower became operational during the 2005–2008 seasons (Figure 19). A record 11,984 chum salmon were enumerated at the North River tower in 2005, followed by a below average count of 5,385 chum salmon in 2006 (Table 21; Figure 20). Both the 2007 (8,151) and 2008 (9,502) chum salmon counts were above the long-term (1985–1986, and 1996–2004) average count of 5,451 chum salmon (Table 21; Figure 20).

Chum salmon runs at the North River tower in 2005 and 2006 had earlier than average run timing, whereas the 2007 and 2008 chum salmon runs exhibited later than average run timing. In 2008, the midpoint of the chum salmon run at the North River tower was August 7, the latest on record (Figure 19; Appendix A19). Peak passage dates ranged from July 1 in 2005 when 1,084 chums were counted to the peak passage of 582 chum salmon that occurred on July 31 in 2008 (Appendices A16 and A19).

### **Age, Sex, and Length Analysis**

Age-0.2 chum salmon represented between 0.1% (2007) and 2.8% (2004) of the test fishery samples, whereas the percentage of age-0.2 chum in the commercial fishery ranged from 4.3% (2005) to 7.7% (2004) (Tables 24–37; Appendices B3–B4). Age-0.3 chum salmon comprised the majority of test fishery and commercial samples during the 2002–2003, 2005 and 2007 seasons. During these years, percentages of age-0.3 ranged from 48.4% (2002) to 85% (2005) in the test fishery (Tables 24, 26, 30, 34; Appendix B3), and from 62.5% (2007) to 93.2% (2003) in the commercial fishery (Tables 25, 27, 31, 35; Appendix B4). Age-0.3 chums also represented 48.4% of the 2008 commercial fishery samples (Table 37). In 2004, 2006, and 2008, age-0.4 chum salmon constituted a majority of the test fishery samples, representing 66.8%, 72.3%, and 58.8%, respectively (Tables 28, 32, and 36; Appendix B3). Commercial samples were comprised of a 60.8% and 55.2% age-0.4 chum majority during the 2004 and 2006 seasons, respectively (Tables 29 and 33; Appendix B4). Age-0.5 chum salmon comprised 6.9% and 8.8% of the 2007 and 2008 test fishery samples, the third and second highest percentages on record, respectively (Tables 34 and 36; Appendix B3). Similarly, age-0.5 chum salmon represented 5.6% and 6.8% of the commercial samples in 2007 (fifth highest) and 2008 (fourth highest), respectively (Tables 35 and 37; Appendix B4). Age-0.6 chum salmon were also present in the test fishery in 2005 and 2007 (0.1%), and 2008 (0.2%) (Tables 30, 34, and 36). Prior to 2005, age-0.6 chum salmon had not been observed since 1997 (Appendix B4).

In the test fishery, sex ratios were skewed heavily towards males from 2002 to 2008 (70–81%). In the commercial fishery, sex ratios were skewed towards females from 2002 to 2003 (54.5%), and skewed towards males from 2004 to 2008 (51–62.8%) (Appendix B4). Except for the 2006 commercial samples (Table 33), males were also consistently larger than females and average length tended to increase with age (Tables 24–37). Chum salmon overall average length in the test fishery ranged from 586.4 mm in 2007 to 601.7 mm in 2002, whereas the average length of



commercially harvested chum salmon was between 571.2 mm (2008) and 596.3 mm (2002) (Tables 24–37).

### **Stock Assessment Summary**

Above-average to record setting chum salmon passage in the North River was consistent with high chum salmon test fishery catches during the 2005, 2007, and 2008 seasons. However, in 2006 the 5,385 chum salmon counted at North River was below the long-term (1984–1986 and 1996–2004) average passage estimate of 5,685 chum salmon and did not correlate with the 1,482 chum salmon caught in the test fishery, the third best test gillnet catch on record (Table 21; Figures 16–17 and 19–20). An inflated test fishery catch in 2006 may have resulted from large-mesh (5 $\frac{7}{8}$ -inch) and bank orientation biases in the test fishery, as well as the dominance of larger age-0.4 chum salmon in the run. The low incidental chum salmon catch in the commercial coho salmon fishery in 2006 further supports the contention that the test fishery catch was inflated. From 2006 to 2008, commercial chum and coho salmon fisheries began between July 18–21 and lasted until mid September, yet the 2006 incidental chum salmon catch was only 57% and 38% of the 2007 and 2008 commercial chum salmon catches, respectively (Table 21; Figure 18). Therefore, below-average counts at the North River tower may more accurately reflect chum salmon run strength than the test fishery during the 2006 season.

North River chum salmon proportional abundance estimates were determined by radiotelemetry during the 2004–2006 seasons to be 0.136, 0.101, and 0.177, respectively (Estensen and Balland *In prep*). Drainagewide chum salmon escapement estimates for the 2004–2006 seasons were calculated by dividing the North River tower chum salmon passage by the actual proportional abundance estimates for those years. The average North River abundance proportion of 0.138 was used to expand tower counts for years in which radiotelemetry work was not conducted. The recent 5-year average drainagewide chum salmon escapement estimate of 70,172 chum salmon was 70% above the long-term average (1984–1986, and 1996–2003) escapement estimate of 41,302 chum salmon, and drainagewide escapements ranged from 30,492 chum salmon in 2006 to a record-high 118,653 chum salmon in 2005 (Table 38; Figure 21). The 2004–2008 average chum salmon total run size for the Unalakleet River drainage was 80,089 chum salmon, which was 45% above the long-term average (1984–1986, and 1996–2004) run size estimate of 55,371 chum salmon (Table 38; Figure 21). Harvest (commercial + subsistence + sport) estimates ranged from low of 4,860 chum salmon in 2003 to a high of 20,453 chum salmon in 2008 (Table 38; Figure 21). Exploitation rates were also low from 2002 to 2008, ranging from 5% in 2005 to 30% in 2008 (Table 38; Figure 21). The recent 5-year average (2004–2008) exploitation rate of 16% was slightly more than half the long-term (1984–1986, and 1996–2004) average exploitation rate of 28% (Table 38; Figure 21).

Commercial fishery samples were consistently represented by higher percentages of age-0.2 and -0.3 chum salmon than samples collected from the test fishery. Average lengths of males and females, from all the major age classes were also smaller in the commercial fishery. Sex ratios remained fairly balanced in the commercial fishery, but were skewed heavily toward males in the test fishery. Disparities in age, sex, and size composition between the test and commercial fisheries samples are most likely the result of large mesh-size bias in the test fishery, and/or the timing of the commercial salmon fishery in Unalakleet River from 2002 to 2008. The test fishery's 5 $\frac{7}{8}$ -inch mesh seems to be more selective for the large male chum salmon but samples are collected throughout the entire run. In contrast, a variety of gillnet gear (5 to 6-inch stretched mesh) is deployed by fishermen in the commercial fishery, which also did not occur until late

July during the 2002–2008 seasons. Despite the skewed sex ratios, the age composition of the test fishery is probably more representative of the run because samples were collected from all segments of the run. High percentages of age-0.2 and -0.3 and female chum salmon in the commercial fishery reflects how these age classes and females comprise the majority the run in late July, whereas the older age classes and males typically exhibit earlier run timing.

There are several indications that odd-numbered year brood years (1999, 2001, and 2003) experienced good rearing and ocean conditions. This was most evident by the high percentages of age-0.2 observed in the 2004 test and commercial fishery samples; and age-0.3 chum salmon present in 2003, 2005, and 2007, as well as age-0.4 chum salmon in 2004, 2006, and 2008 (Appendices B3–B4). Conversely, even-numbered brood years (2000, 2002, and 2004) made relatively small contributions to runs from 2004 to 2008 suggesting that they encountered less favorable overwintering and/or rearing conditions at various life stages (Appendices B3–B4). One potential limiting factor affecting survival of these brood years and chum salmon production may be the enormous pink salmon runs that occurred in the Unalakleet River during the 2002, and 2004–2006 seasons. Ruggerone and Agler (2008) conducted a retrospective analysis of Kwiniuk River (Moses Point Subdistrict, Norton Sound District) chum salmon scale growth in relation to pink salmon abundance in Norton Sound. Their investigation revealed that scale growth of odd-numbered year migrating chum salmon fry was significantly less than chum salmon fry emigrating during even-numbered years. Chum salmon marine growth during the first year at sea was also negatively correlated with adult pink salmon abundance during the previous year (Ruggerone and Agler 2008). Perhaps competition between adult chum and pink salmon for suitable spawning habitat, as well as competition between emigrating chum and pink salmon fry for zooplankton in the freshwater and nearshore marine environments adversely affected Unalakleet River chum salmon returns from the 2000, 2002, and 2004 brood years. The third highest pink salmon test net catch (3,952) occurred in 2005, as did the second highest pink salmon passage estimate (1,670,934) at North River tower (Table 39). An abundance of pink salmon may have also had an impact on the 2005 brood year, which may result in poor chum salmon runs in 2009 and 2010.

With the exception of 2006, data collected from the test fishery and North River tower during the 2002–2008 seasons suggests that chum salmon runs would have supported considerably larger commercial harvests had the fishery commenced in late June or early July. Low exploitation rates and incidental harvests are likely to continue to characterize the Unalakleet Subdistrict commercial chum salmon fishery in the near future. This is largely the result of conservation concerns with Chinook salmon, which have thus far precluded commercial exploitation of chum salmon during peak migration periods because Chinook salmon are incidentally caught in this fishery. Unless other conservation measures can be implemented to conserve Chinook salmon while allowing the harvest of chum salmon, the timing of the directed chum salmon commercial fishery will continued to be predicated on Chinook salmon run strength and timing in the near future.

## **PINK SALMON**

### **Test Fishery**

The test fishery had above-average to record-setting pink salmon catches during the 2002–2008 seasons. Cumulative CPUE for the 2003, 2005, and 2007 seasons was above the odd-numbered year historical average and a record high odd-numbered year test fishery catch of 3,952 pink

salmon occurred in 2005 (Table 39; Figures 22–23). For the 2002 and 2004 seasons, cumulative CPUE was slightly below the even-numbered year historical average despite above average catches of 1,886 and 1,863 pink salmon, respectively (Table 39; Figures 24–25). Both catches and CPUE were above the long-term even-numbered year average during the 2006 and 2008 seasons, and the 7,599 pink salmon caught in 2006 shattered the previous record catch of 4,221 pink salmon in 1994 (Table 39; Figures 24–25). In 2006, a record high daily catch of 395 pink salmon also occurred on July 19 (Appendix A9).

Regardless of the test net's gender bias towards males with developed humps, test fishery catches of pink salmon provide an index of run strength and meaningful comparisons can be made among years. Based on test gillnet catches, pink salmon runs exhibited earlier than average run timing in 2002 and 2004–2005, average run timing in 2003, and later than average run timing from 2006 to 2008 (Appendix A15). The July 3 midpoint of the 2002 test fishery tied for the earliest on record for even-numbered pink salmon runs, and the July 16 midpoint in 2005 was the second earliest for odd-numbered years (Appendix A15). Dates of peak pink salmon catches ranged from July 2 in 2002 to July 28 in 2003.

### **Commercial Fishery**

There was no pink salmon commercial harvest during the years 2002–2006 due to a lack of market interest even though large surpluses were available (Tables 39, and 40–43; Figure 26). In 2007, 2,121 pink salmon were incidentally harvested in the chum salmon commercial fishery and purchased for crab bait (Table 22; Figure 26). Improved pink salmon roe and fillet markets led to a directed pink salmon commercial fishery in 2008, which consisted of four 6-hour periods from July 8 to 11 and four 8-hour periods from July 12 to 15 (Table 23). A total of 48,698 pink salmon were harvested in the commercial fishery, the tenth largest on record and the largest since 1998 (Table 39; Figure 26). Historically, however, the 2008 harvest was only 60% of the 1985–2001 average and the second lowest harvest for even-numbered years in which there was a directed pink salmon fishery (Table 39; Figure 26).

### **North River Counting Tower**

Large pink salmon escapements occurred at the North River tower during the 2005–2008 seasons. An estimated 1,670,934 pink salmon were enumerated in 2005, and 2,169,890 pink salmon in 2006 (Table 39; Figures 27–29). These escapements were consistent with high test fishery catches observed during the 2005–2006 seasons. North River tower pink salmon passage estimates in 2007 (580,929) and 2008 (241,471) were only 35% and 11% of the parent-year escapements that occurred from 2005 to 2006, respectively (Table 39; Figure 29). However, the 2007 pink salmon count was nearly 600% of the recent 5-year (1997–2003) odd-numbered year average count of 97,246 pink salmon shown in Figure 29. Conversely, for even-numbered years, the 2008 tower count was 36% below the recent 5-year (1996–2004) even-numbered year average count of 379,819 pink salmon, and was the fourth lowest since 1984 (Figure 29).

### **Stock Assessment Summary**

Pink salmon production in the Unalakleet Subdistrict increased markedly during the last decade. Above-average to record-setting pink salmon test fishery catches and tower counts were observed during the 2002–2008 seasons. This was consistent with increased abundance of pink salmon in northern Norton Sound drainages in the 2000s (Kent 2006, 2007; Kent et al. 2008; Menard and Kent 2005). Huge escapements of pink salmon in the Unalakleet River drainage,

particularly during the 2005–2006 seasons, may have led to overcrowding and other density-dependent factors, which in turn led to poor survival of eggs and emerging fry from the 2005 and 2006 brood years. Commercial exploitation of Norton Sound pink salmon is anticipated to increase in the near future, although gear and processor limitations may preclude local fishermen from taking full advantage of enormous pink salmon runs like those which occurred in 2005 and 2006.

## **COHO SALMON**

### **Test Fishery**

Coho salmon test fishery catches were above the long-term (1985–2001) average during the 2002–2008 seasons (Table 44). From 2004 to 2006, record coho salmon test fishery catches (829, 1,080, and 1,738 coho salmon, respectively) and CPUE (36.13, 58.93, and 72.42 index points, respectively) were observed during the 2004–2006 seasons (Table 44; Figures 30–31). A near-record catch of 1,087 coho salmon occurred in 2007 followed by a new record catch of 1,988 coho salmon in 2008 (Table 44; Figures 30–31). Historically, the second highest daily catch of 94 coho salmon occurred on 4 August in 2006, and the third highest catch of 93 coho salmon occurred on 13 August in 2004 (Appendices A5 and A9). Additionally, a record late-season catch of 77 coho salmon occurred on 8 September during the 2006 season (Appendix A9).

Coho salmon runs had later than average run timing during the 2002–2003 seasons; the August 25 midpoint in the 2002 test fishery was the third latest on record (Figure 30; Appendix A15). During the 2004–2006 seasons, the coho salmon test fishery had average run timing with midpoints ranging from August 15 to 19 (Figure 30; Appendix A15). The 2007 coho salmon test fishery tied the 1986 season for having the second earliest midpoint of 6 August (Figure 30; Appendix A15).

### **Commercial Fishery**

Commercial coho salmon catches and CPUE for the 2002–2008 seasons are summarized with the test fishery and escapement information in Table 44. Figure 32 provides a historical comparison of commercial coho salmon catch and CPUE from 1985 to 2008.

The 2002 commercial coho salmon harvest of 1,084 was the poorest on record, and only 5 permit holders participated during 7 out of the eight 24-hour openings that were permitted (Table 40). Brief periods were used to evaluate coho salmon run strength before allowing additional fishing time. However, weak catch rates persisted throughout the duration of the fishery, and the fishery was closed on August 20. Fishermen participation increased to 21 permit holders in 2003 despite another below average commercial coho salmon harvest. The 2003 harvest of 13,029 coho salmon was the third lowest harvest on record since 1979 (Table 41; Figure 32).

In stark contrast to the 2002 and 2003 seasons, commercial coho salmon catches and participation in the fishery increased substantially during 2004–2008. The commercial harvest in 2004 of 29,282 coho salmon was more than double the 2003 catch and the highest since 2000 (Table 42). From 2004 to 2008, three of the four largest coho salmon commercial catches occurred in the Unalakleet Subdistrict, including a record 98,336 coho salmon harvested in 2006 (Tables 43–44; Figure 32). Fishing effort increased to 25 permit holders in 2004 (Table 42), and more than doubled 5 years later when 58 permits were fished during the 2008 commercial season (Table 23). Record (2004–2005, and 2007) and near-record (2006 and 2008) cumulative CPUE

also occurred from 2004 to 2008, probably due to relatively low level of fishing effort compared to that of the 1980s and 1990s (Table 44; Figure 32). Record-setting late-season test fishery coho salmon catches and continued buyer interest also led to week long extensions to the commercial coho salmon season during the 2006 and 2008 seasons.

### **North River Counting Tower**

Expanded daily and cumulative total coho salmon tower counts from 2005 to 2008 are shown in Appendices A16–A19, respectively. Coho salmon began showing up at the North River tower as early as July 4 (2005) and no later than July 11 (2006) (Figure 33). Coho salmon trends at the North River tower were similar to those observed in the test fishery during 2005–2008. Above-average to record-setting coho salmon escapements were observed at the North River counting tower, including a record 19,189 coho salmon that were enumerated in 2005 (Table 44; Figure 34). This record escapement was followed by an above average escapement of 9,835 coho salmon in 2006, and later eclipsed by a new record escapement of 19,965 coho salmon (Table 44; Figure 34).

Prior to 2001, the North River tower project was only operated until late July or early August. Therefore, comparisons of coho salmon run timing for the 2005–2008 seasons with historical coho salmon runs prior to 2001 are not possible. Midpoint dates of cumulative coho salmon passage at the North River tower for the 2005–2008 seasons were August 17, August 15, August 6, and August 15, respectively (Figure 33; Appendices A16–A19). The 2005 and 2006 North River coho salmon runs had later than average (2001–2004) run timing whereas the 2007 coho salmon run had earlier than average run timing; the 2008 run exhibited average run timing (ADF&G 2004). In 2007, there were several hours where counts were not possible due to increased precipitation and subsequent high water during the month of August. Persistent high water levels throughout the month of August in 2007 may have hastened the migration of coho salmon, which may in part account for the early run timing at the North River tower.

### **Age, Sex, and Length Analysis**

Unalakleet River test fishery coho salmon age, sex, and length composition from 1985 to 2008 is summarized in Appendix B5 and historical commercial fishery coho salmon age, sex, and length composition is presented in Appendix B6. Coho salmon sampled from the test and commercial fisheries differed during the 2002 and 2004 seasons, but exhibited similar age composition during 2003, and 2005–2008 (Tables 45–58; Appendices B5–B6). For example, representation by age-1.1 coho salmon in the commercial fishery during 2002 (3.8%) and 2004 (5.6%) was less than half the 12.8% and 12.7% age-1.1 observed in the 2002 and 2004 test fishery samples, respectively (Appendices B5–B6). Age-1.1 coho salmon comprised 15.5%, 15.2%, 35.3%, 19.5%, and 20.8% of the samples during the 2003 and 2005–2008 seasons, respectively (Appendix B5). This was very similar to the 11.5%, 11.5%, 38.5%, 20.7% and 22.7% age-1.1 that comprised the commercial samples in 2003, and from 2005 to 2008, respectively (Appendix B6). Percentages of age-2.1 coho salmon in the test fishery ranged from 60.9% in 2006 to the 82.9% observed in 2004 (Appendix B5). Likewise, the percentage of age-2.1 coho salmon in the commercial fishery samples ranged from 57.1% in 2006 to 90% in 2004 (Appendix B6). Age-3.1 coho salmon made similar contributions to the test fishery and commercial fishery samples in all years except for the 2008 season in which the test fishery had 6.9% age-3.1 versus 12.3% observed in the commercial fishery samples (Tables 57–58; Appendices B5–B6). There were 13.1%, 6.1%, 4.4%, 2.8%, 3.8%, and 2.3% age-3.1 in the test fishery samples from 2002 to

2007, respectively, which tracked closely with commercial samples comprised of 11.5%, 9.5%, 4.4%, 2.2%, 4.4%, and 2.3% age-3.1 from 2002 to 2007 (Appendices B5–B6).

Males represented the majority of fish sampled in the test fishery in 2002 and from 2004 to 2008 (50.5–62.5% of the samples), as well as the majority of commercial samples in 2002, and from 2004 to 2006 and 2008 (50.7–64.5% of the samples) (Appendices B5–B6). Females tended to be slightly larger than males from both sample sources during most years, and average length tended to increase as age increased (Tables 45–58). Overall average length in the test fishery ranged from 565.7 mm (2006) to 608.5 mm (2002), and coho salmon sampled from the commercial fishery had average lengths ranging from 559.1 mm (2006) to 595.4 mm (2003).

### **Stock Assessment Summary**

Coho salmon catches in the test fishery were slightly above the long-term (1985–2001) average catch of 257 coho salmon from 2002 to 2003, but well above average to record-setting from 2004 to 2008 (Table 44; Figure 31). Similarly, commercial coho salmon catches were below the long-term (1985–2001) average commercial catch of 34,485 coho salmon from 2002 to 2004, but well above average to record-setting from 2005 to 2008 (Table 44; Figure 32). North River coho salmon escapements were also below average and somewhat consistent with average test fishery and commercial coho salmon catches during the 2002–2003 seasons, but near-record to record-setting from 2004 to 2009 (Table 44; Figure 34).

Drainagewide escapement estimates were calculated by dividing the annual North River tower coho salmon passage by proportional abundance estimates determined from radiotelemetry investigations conducted by Joy and Reed (2007). The 2004–2006 drainagewide escapements were calculated by dividing North River passage by the abundance estimates of 0.152, 0.143, and 0.083 for the 2004–2006 seasons, respectively (Joy and Reed 2007). For the 1996–2003 and 2007–2008 seasons, North River coho salmon passage estimates were divided by the 2004–2006 average proportion (0.126) of coho salmon migrating into the North to obtain drainagewide escapement estimates for those years. Using these proportional abundance estimates, the recent 5-year (2004–2008) average drainagewide escapement of 123,444 coho salmon was 140% above the previous 4-year (1999 and 2001–2003) average drainagewide coho salmon escapement of 51,544 coho salmon (Table 59; Figure 35). Harvests of coho salmon also increased dramatically beginning in 2004. The long-term (1996–2003) average combined harvest of 28,622 coho salmon was only 36% of the recent 5-year (2004–2008) average harvest of 78,887 coho salmon (Table 59; Figure 35). Total run-size estimates for Unalakleet River coho salmon averaged 202,331 coho salmon from 2004 to 2008 compared to the long-term (1999 and 2001–2003) average run size estimate of 67,809 coho salmon (Table 59; Figure 35). Exploitation rates from 2002 to 2008 ranged from 20% in 2002 to 47% in 2006 (Table 59; Figure 35).

Age, sex, and length compositions of coho salmon sampled in the test and commercial fisheries were fairly consistent during the 2002–2008 seasons. The exceptions were 2002 and 2004 in which the commercial samples had considerably lower percentages of age-1.1 coho salmon. In 2002, commercial fishing effort was very limited and the fishery was closed early because there were concerns that escapement and subsistence fishing needs would not be met. Typically, age-1.1 fish show up in greater numbers during the latter half of the coho salmon run, which may in part account for the disparities between the test and commercial fisheries age composition. It is unclear why the percentages of age-1.1 coho salmon differed in 2004, although it may be due to sampling error.

From 2005 to 2008, above average percentages of age-1.1 coho salmon were present in both the test fishery and commercial catch samples (Appendices C5–6). Additionally, the 35.3% age-1.1 in the 2006 test fishery and 38.5% age-1.1 coho salmon in the commercial fishery were record highs (Appendices C5–6). Consistently, high percentages of age-1.1 coho salmon indicate that the 2002–2005 brood years experienced good survival conditions. In contrast to the inhibitory effect that large pink salmon runs may have had on Unalakleet River chum salmon growth and/or abundance in some years, they may have contributed to the surge in coho salmon production in recent years. During their second year of freshwater growth, it is possible that juvenile coho salmon spawned from the 2002 to 2005 brood years may have benefited from large pink salmon runs by being able to scavenge from the numerous eggs and adult pink salmon carcasses in the Unalakleet River. During the emigration period, piscivorous coho salmon smolt may have also attained a larger body size for their ocean migration by preying on prodigious numbers of pink salmon fry in the Unalakleet River and nearshore environment.

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## **TABLES**

Table 1.—Historical cumulative (Cum.) catch and catch per unit effort (CPUE) by species compared to the historical average, Unalakleet River test net, Norton Sound, 1985–2008.

Year	Project Dates	Chinook Salmon			Chum Salmon			Pink Salmon			Coho Salmon		
		Cum. Catch	Cum. CPUE	Cum. CPUE by Rank	Cum. Catch	Cum. CPUE	Cum. CPUE by Rank	Cum. Catch	Cum. CPUE	Cum. CPUE by Rank	Cum. Catch	Cum. CPUE	Cum. CPUE by Rank
1985	6/07-9/22	193	9.93	1	916	44.75	11	17	0.68	24	206	11.56	13
1986	6/04-9/11	52	2.19	14	1,063	49.49	7	838	39.72	14	163	9.01	20
1987	6/16-9/08	52	2.23	13	707	29.61	20	105	4.11	23	149	6.58	24
1988	6/06-9/12	15	0.67	24	662	30.17	19	1,066	49.52	12	216	9.26	18
1989	6/12-9/13	50	2.03	15	856	40.76	14	1,420	72.74	10	232	9.82	17
1990	6/13-9/13	43	1.82	18	383	19.08	24	831	41.64	13	284	14.01	10
1991	6/06-9/10	36	1.71	19	834	40.57	15	473	19.44	18	177	8.46	22
1992	6/06-9/12	25	1.18	22	976	44.97	10	2,149	96.50	7	455	24.92	7
1993	6/07-9/08	94	4.61	7	700	32.27	18	219	10.26	22	156	7.28	23
1994	6/16-9/08	35	1.53	20	949	48.75	9	4,221	264.59	2	297	14.13	9
1995	6/05-9/11	99	4.79	6	1,212	58.29	4	250	13.57	20	213	9.13	19
1996	6/05-9/11	138	6.53	3	1,635	87.43	1	2,412	115.52	6	717	35.88	6
1997	6/02-9/10	202	8.52	2	832	39.34	16	510	24.94	16	197	9.00	21
1998	6/05-9/09	110	4.94	5	535	25.44	22	529	25.79	15	220	11.27	14
1999	6/21-9/08	63	2.85	12	1,022	49.90	6	365	16.40	19	206	10.46	16
2000	6/14-9/08	61	1.97	16	1,075	48.94	8	216	10.44	21	257	11.73	11
2001	6/14-9/07	79	3.29	10	645	29.22	21	427	21.68	17	219	11.70	12
2002	6/03-9/11	44	1.83	17	852	36.42	17	1,886	78.48	8	394	15.21	8
2003	6/02-9/09	25	1.00	23	458	23.35	23	3,607	183.73	4	267	11.13	15
2004	6/02-9/10	29	1.31	21	976	41.67	13	1,863	77.29	9	829	36.13	5
2005	6/04-9/09	78	3.25	11	1,209	56.74	5	3,952	192.48	3	1,080	58.93	3
2006	6/08-9/14	79	3.29	9	1,482	61.75	3	7,599	316.63	1	1,738	72.42	2
2007	6/04-9/09	96	4.00	8	978	42.92	12	1,471	63.79	11	1,087	52.71	4
2008	6/09-9/13	123	5.13	4	1,931	87.16	2	2,792	121.87	5	1,988	100.50	1
Average 1985–2001		79	3.58		882	42.29		944	48.68		257	12.60	

Table 2.—Chinook salmon cumulative commercial catch and escapement data, Unalakleet Subdistrict, Norton Sound, 1985–2008.

Year	<u>Commercial Fishery</u>		<u>Test Fishery</u>		North River Tower Counts	Unalakleet River Drainage Aerial Surveys			
						Unalakleet and Old			Unalakleet and Old
	Catch	CPUE	Catch	CPUE		North River	Old Woman River	Unalakleet River	
1985	12,621	4.75	193	9.93	1,426	873	202	400	602
1986	4,494	1.98	52	2.19	1,613	<sup>b</sup>	<sup>b</sup>	373	373
1987	3,246	2.77	52	2.23	<sup>c</sup>	445	132	344	476
1988	2,218	1.64	15	0.67	<sup>c</sup>	202	311	923	1,234
1989	4,402	2.74	50	2.03	<sup>c</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	
1990	5,998	3.64	43	1.82	<sup>c</sup>	255	211	464	675
1991	4,534	2.63	36	1.71	<sup>c</sup>	661	403	1,253	1,656
1992	3,402	1.72	25	1.18	<sup>c</sup>	329	<sup>b</sup>	<sup>b</sup>	
1993	5,944	4.08	94	4.61	<sup>c</sup>	900	407	253	660
1994	4,400	5.07	35	1.53	<sup>c</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	
1995	7,617	2.15	99	4.79	<sup>c</sup>	622	424	532	956
1996	3,644	2.84	138	6.53	1,197	106 <sup>b</sup>	55 <sup>b</sup>	<sup>b</sup>	55
1997	9,067	7.67	202	8.52	4,185	1,605	246	991	1,237
1998	6,228	4.84	110	4.94	2,100	591	312	739	1,051
1999	1,927	2.92	63	2.85	1,639	18 <sup>b</sup>	<sup>b</sup>	3 <sup>b</sup>	3
2000	582	1.25	61	1.97	1,046	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	
2001	116	0.36	79	3.29	1,337	367	<sup>b</sup>	<sup>b</sup>	
2002	4	<sup>a</sup>	44	1.83	1,484	122 <sup>b</sup>	33 <sup>b</sup>	28 <sup>b</sup>	61
2003	10	<sup>a</sup>	25	1.00	1,452	154 <sup>b</sup>	<sup>b</sup>	168 <sup>b</sup>	168
2004	22	<sup>a</sup>	29	1.31	1,125	189 <sup>b</sup>	89 <sup>b</sup>	309 <sup>b</sup>	398
2005	101	0.58	78	3.25	1,015	156 <sup>b</sup>	204	306	510
2006	12	<sup>a</sup>	79	3.29	906	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	
2007	13	<sup>a</sup>	96	4.00	1,948	554	179	642	821
2008	65	<sup>a</sup>	123	5.13	903	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	
Average 1985-2001 <sup>d</sup>	4,732	3.12	79	3.58	1,691	536	270	627	816

<sup>a</sup> There were no directed Chinook salmon openings so cumulative CPUE was not calculated.

<sup>b</sup> Early, late, or poor survey conditions, or survey not flown.

<sup>c</sup> North River Tower Project was not conducted.

<sup>d</sup> North River Tower historical average is from 1985 to 1986 and 1996 to 2004.

Table 3.—Annual Chinook salmon reported inseason marine and Unalakleet River subsistence harvests compared to postseason survey Chinook salmon harvest and historical average, Unalakleet Subdistrict, Norton Sound, 1985–2008.

Year	Reported Inseason Subsistence Harvests			Chinook Salmon Harvest from Postseason Surveys	Inseason Harvest as a Percentage of the Postseason Harvest
	Unalakleet River Chinook Salmon Harvest	Marine Chinook Salmon Harvest	Total Inseason Harvest		
1985	373	a	373	1,397	27
1986	358	a	358	a	
1987	294	a	294	a	
1988	97	a	97	a	
1989	84	320	404	a	
1990 <sup>b</sup>	151	a	151	2,476	6
1991	185	a	185	a	
1992	53	a	53	a	
1993	629	a	629	a	
1994	331	341	672	3,035	22.1
1995	178	240	418	3,114	13.4
1996	a	a	a	3,023	
1997	243	814	1,057	4,191	24.1
1998	81	242	323	4,066	7.9
1999	315	494	809	2,691	29.4
2000	267	677	944	2,429	37.9
2001	290	454	744	2,810	25.8
2002	114	235	349	2,367	14.5
2003	72	479	551	2,585	21.1
2004	401	919	1,320	2,829	46.6
2005	227	682	909	2,193	43.0
2006	724	963	1,687	2,537	78.3
2007	1,245	401	1,646	1,666	98.9
2008	970	100	1,070	1,402	76.3
Average 1985–2001 <sup>c</sup>	246	448	469	3,191	22.9

<sup>a</sup> Survey not conducted.

<sup>c</sup> Postseason subsistence harvest estimated from Division of Subsistence surveys.

<sup>b</sup> Historical average for marine harvest is from 1989 to 2001, excluding 1990 to 1993 and 1996. Historical average for the Unalakleet River is from 1985 to 2001, excluding 1996.

Table 4.—Commercial salmon harvest and cumulative (Cum.) catch per unit effort (CPUE) by fishing period, Unalakleet Subdistrict, Norton Sound, 2005.

Period	Target Species	Dates Fished	Hours Fished	Permits Fished	Chinook Salmon			Coho Salmon			Chum Salmon		
					Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE
1	Chinook	6/27-6/28	24	9	81	0.38	0.38				132	0.61	0.61
2	Chinook	6/29-6/30	24	4	20	0.21	0.58				48	0.50	3.37
3	Coho	7/24-7/26	48	9	0	0.00	0.38	2,944	6.81	6.81	974	2.25	2.87
4	Coho	7/27-7/29	48	13	0	0.00	0.58	3,442	5.52	12.33	696	1.12	4.48
5	Coho	8/02-8/04	48	18	0	0.00	0.58	8,858	10.25	22.58	932	1.08	5.56
6	Coho	8/05-8/07	48	17	0	0.00	0.58	5,117	6.27	28.85	410	0.50	6.06
7	Coho	8/08-8/10	48	20	0	0.00	0.58	7,867	8.19	37.05	0	0.00	6.06
8	Coho	8/11-8/13	48	23	0	0.00	0.58	11,152	10.10	47.15	0	0.00	6.06
9	Coho	8/15-8/17	48	19	0	0.00	0.58	5,588	6.13	53.28	0	0.00	6.06
10	Coho	8/18-8/20	48	24	0	0.00	0.58	5,646	4.90	58.18	0	0.00	6.06
11	Coho	8/22-8/24	48	14	0	0.00	0.58	5,374	8.00	66.18	0	0.00	6.06
12	Coho	8/25-8/27	48	12	0	0.00	0.58	3,428	5.95	72.13	0	0.00	6.06
13	Coho	8/29-8/31	48	11	0	0.00	0.58	2,534	4.80	76.93	0	0.00	6.06
14	Coho	9/02-9/04	48	10	0	0.00	0.58	1,749	3.64	80.57	0	0.00	6.06
Totals			624	29	101	0.58	0.58	63,699	80.57	80.57	3,192	6.06	6.06

Note: There were 280 sockeye salmon harvested from July 24 to August 4 in 2005. The buyer did not purchase chum salmon after period 6.

Table 5.—Historical salmon escapements at North River counting tower, 1972–1974, 1984–1986, and 1996–2008, Unalakleet River drainage, Norton Sound.

Year	Operating period	Chum	Pink	Chinook	Coho
1972	July 07-July 28	2,332	54,934	561	
1973	June 29-July 23	4,334	26,542	298	
1974	June 25-July 17	826	143,789	196	
1984	June 25-July 28	2,915	458,387	2,844	
1985	June 27-Aug 31	4,567	4,360	1,426	2,045
1986	June 25-July 18	3,738	236,487	1,613	
1996	June 16-July 25	9,789	332,539	1,197	1,229
1997	June 16-Aug 21	6,904	127,926	4,185	5,768
1998	June 15-Aug 12	1,526	74,045	2,100	3,361
1999	June 30-Aug 31	5,600	48,993	1,639	4,792
2000	June 17-Aug 12	4,971	69,703	1,046	6,961
2001	July 05-Sept 15	6,515	24,737	1,337	12,383
2002	June 19-Aug 29	6,143	324,595	1,484	3,210
2003	June 15-Sept 13	9,859	280,212	1,452	5,837
2004	June 15-Sept 14	10,036	1,162,978	1,125	11,187
2005	June 15-Sept 15	11,984	1,670,934	1,015	19,189
2006	June 18-Sept 11	5,385	2,169,890	906	9,835
2007	June 16-Sept 05	8,046	583,320	1,948	19,944
2008	June 19-Sept 13	9,502	241,798	903	15,648
Average <sup>a, b</sup>		6,047	435,198	1,787	6,576
Average (Odd Years) <sup>c</sup>			120,467		
Average (Even Years) <sup>c</sup>			392,772		

<sup>a</sup> Long-term historical averages for Chinook and chum salmon are from 1984 to 1986 and 1996 to 2004.

<sup>b</sup> Coho salmon average is from 1985 to 2004, excluding 1996 to 1998 and 2000 because the majority of the run was not counted during those years.

<sup>c</sup> Odd-year pink salmon historical average is from 1985 to 2003 and even-year average is from 1984 to 2004.



Table 6.—Unalakleet River test fishery Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2002.

Sampling Dates: 6/07–7/13 Sample size: 43		Brood Year and (Age Group)						
		1998 (1.2)	1997 (1.3)	(2.2)	1996 (1.4)	1995 (1.5) (2.4)		Totals
Male	Number of Samples	8	28	1	2			39
	Percent of Samples	19	67	2	5			93
	Mean Length (mm)	566	713	665	790			685
Female	Number of Samples				1	1	1	3
	Percent of Samples				2	2	2	7
	Mean Length (mm)				800	790	965	852
Total	Number of Aged Samples	8	28	1	3	1	1	42
	Percent of Samples	19	67	2	7	2	2	100
	Mean Length (mm)	566	713	665	793	790	965	697

Table 7.—Unalakleet River test fishery Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2003.

Sampling Dates: 6/02-7/07 Sample size: 26		Brood Year and (Age Group)				Totals	
		1999 (1.2)	1998 (1.3)	1997 (1.4)	1996 (2.3)		1996 (2.4)
Male	Number of Samples	1	14	0	2		17
	Percent of Samples	4	61	0	9		69
	Mean Length (mm)	570	700	0	740		687
Female	Number of Samples		3	2		1	6
	Percent of Samples		13	9		4	31
	Mean Length (mm)		767	845		880	814
Total	Number of Aged Samples	1	17	2	2	1	23
	Percent of Samples	4	74	9	9	4	100
	Mean Length (mm)	570	712	845	740	880	727

Table 8.—Unalakleet River test fishery Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2004.

Sampling Dates: 6/09-9/09 Sample size: 30		Brood Year and (Age Group)					Totals	
		2000 (1.2)	1999 (1.3)	(2.2)	1998 (1.4)	(2.3)		1997 (2.4)
Male	Number of Samples	2	7	2	2		1	14
	Percent of Samples	9	30	9	9		4	63
	Mean Length (mm)	593	656	657	768		607	663
Female	Number of Samples		1	1	4	1	2	9
	Percent of Samples		4	4	17	4	9	37
	Mean Length (mm)		567	885	854	790	828	826
Total	Number of Aged Samples	2	8	3	6	1	3	23
	Percent of Samples	9	35	13	26	4	13	100
	Mean Length (mm)	593	645	733	800	790	754	720

Note: Sex ratios and average lengths for Tables 6–8 include samples with unreadable scales.

Table 9.—Unalakleet River test fishery Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2005.

		Brood Year and (Age Group)					
Sampling Dates:	6/12-7/11	2001	2000		1999	1998	
Sample size:	80	(1.2)	(1.3)	(2.2)	(1.4)	(2.3)	Totals
Male	Number of Samples	50	5	1	2	1	59
	Percent of Samples	74	7	2	3	2	89
	Mean Length (mm)	580	680	572	775	684	595
Female	Number of Samples	1	1		6	1	9
	Percent of Samples	2	2		9	2	11
	Mean Length (mm)	574	760		826	693	776
Total	Number of Aged Samples	51	6	1	8	2	68
	Percent of Samples	75	9	2	12	3	100
	Mean Length (mm)	579	694	572	814	689	615

Note: Sex ratios and average lengths include samples with unreadable scales.

Table 10.—Unalakleet commercial fishery Chinook salmon age composition, Unalakleet Subdistrict, Norton Sound, 2005.

		Brood Year and (Age Group)					
Sampling Dates:	6/28-6/29	2001	2000	1999		1998	
Sample size:	43	(1.2)	(1.3)	(1.4)	(2.3)	(2.4)	Totals
Total	Number of Samples	4	6	26	5	2	43
	Percent of Samples	9	14	61	12	5	100

Note: Sex and length data unavailable for commercially sampled Chinook in 2005.

Table 11.—Unalakleet River test fishery Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2006.

		Brood Year and (Age Group)				Totals
		2002	2001	2000		
Sampling Dates:	6/15-7/26					
Sample size:	79	(1.2)	(1.3)	(1.4)	(2.3)	
Male	Number of Samples	43	18	1	1	76
	Percent of Samples	65	27	2	2	96
	Mean Length (mm)	585	703	692	691	625
Female	Number of Samples		3			3
	Percent of Samples		5			4
	Mean Length (mm)		783			783
Total	Number of Aged Samples	43	21	1	1	66
	Percent of Samples	65	32	2	2	100
	Mean Length (mm)	585	718	692	691	631

Note: Sex ratios and average lengths include samples with unreadable scales.

Table 12.—Unalakleet River test fishery Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2007.

		Brood Year and (Age Group)			Totals
		2003	2002	2001	
Sampling Date(s):	6/17-7/19				
Sample size:	94	(1.2)	(1.3)	(1.4)	
Male	Number of Samples	49	16		75
	Percent of Samples	61	20		80
	Mean Length (mm)	558	710		596
Female	Number of Samples	3	7	6	19
	Percent of Samples	4	9	7	20
	Mean Length (mm)	617	746	838	768
Total	Number of Aged Samples	52	23	6	81
	Percent of Samples	64	28	7	100
	Mean Length (mm)	562	721	838	627

Table 13.—Unalakleet River subsistence fishery (8-inch mesh gillnets) Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2007.

		Brood Year and (Age Group)				Totals
		2003	2002	2001	2000	
Sampling Date(s):	6/15-7/03					
Sample size:	92	(1.2)	(1.3)	(1.4)	(2.4)	
Male	Number of Samples	8	23	15		54
	Percent of Samples	10	29	19		59
	Mean Length (mm)	543	719	854		726
Female	Number of Samples		8	24	1	38
	Percent of Samples		10	30	1	41
	Mean Length (mm)		772	854	740	825
Total	Number of Aged Samples	8	31	39	1	79
	Percent of Samples	10	29	49	1	100
	Mean Length (mm)	543	728	854	740	767

Table 14.—Marine subsistence fishery (8-inch mesh gillnets) Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2007.

		Brood Year and (Age Group)						
Sampling Date(s):	6/19-7/04	2003	2002	2001		2000		
Sample size:	220	(1.2)	(1.3)	(1.4)	(2.3)	(1.5)	(2.4)	Totals
Male	Number of Samples	32	22	27	1	1	1	106
	Percent of Samples	18	13	15	1	1	1	48
	Mean Length (mm)	552	738	840	863	966	850	721
Female	Number of Samples		24	65	2		1	114
	Percent of Samples		14	37	1		1	52
	Mean Length (mm)		761	854	703		860	824
Total	Number of Aged Samples	32	46	92	3	1	2	176
	Percent of Samples	18	26	52	2	1	1	100
	Mean Length (mm)	552	750	850	756	966	855	774

Note: Sex ratios and average lengths for Tables 12–14 include samples with unreadable scales.

Table 15.—Unalakleet River Chinook salmon escapement (caught in beach seines) age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2007.

		Brood Year and (Age Group)				Totals
		2004	2003	2002	2001	
Sampling date(s):	6/23-7/14	(1.1)	(1.2)	(1.3)	(1.4)	
Sample size:	220					
Male	Number of Samples	2	123	16	15	196
	Percent of Samples	1	70	9	9	89
	Mean Length (mm)	311	534	711	852	577
Female	Number of Samples		3	9	8	24
	Percent of Samples		2	5	5	11
	Mean Length (mm)		632	712	809	736
Total	Number of Aged Samples	2	126	25	23	176
	Percent of Samples	1	72	14	13	100
	Mean Length (mm)	311	535	712	837	594

Table 16.—Unalakleet River test fishery Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, 2008.

		Brood Year and (Age Group)			Totals
		2004	2003	2002	
Sample Date(s):	6/17-7/25	(1.2)	(1.3)	(1.4)	
Sample Size:	123				
Male	Number of Samples	16	59		94
	Percent of Samples	17	61		76
	Mean Length (mm)	575	690		662
Female	Number of Samples		12	10	29
	Percent of Samples		12	10	24
	Mean Length (mm)		748	841	788
Total	Number of Samples	16	71	10	97
	Percent of Samples	17	73	10	100
	Mean Length (mm)	575	700	841	692

Table 17.—Unalakleet River subsistence fishery (8-inch mesh gillnets) Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, 2008.

		Brood Year and (Age Group)				Totals
		2004	2003	2002		
Sampling date(s):	6/21-6/28	(1.2)	(1.3)	(1.4)	(2.3)	
Sample Size:	29					
Male	Number of Samples	1	12	1	1	21
	Percent of Samples	6	67	6	6	83
	Mean Length (mm)	550	735	715	830	724
Female	Number of Samples			3		8
	Percent of Samples			17		17
	Mean Length (mm)			873		873
Total	Number of Aged Samples	1	12	4	1	18
	Percent of Samples	6	67	22	6	100
	Mean Length (mm)	550	735	834	830	749

Note: Sex ratios and average lengths for Tables 15–17 include samples with unreadable scales.

Table 18.—Marine subsistence fishery (8-inch mesh gillnets) Chinook salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2008.

Sampling date(s): 6/21-7/05 Sample Size: 128		Brood Year and (Age Group)		Totals
		2003	2002	
		(1.3)	(1.4)	
Male	Number of Samples	50	9	73
	Percent of Samples	51	9	57
	Mean Length (mm)	734	804	740
Female	Number of Samples	28	11	55
	Percent of Samples	29	11	43
	Mean Length (mm)	758	865	786
Total	Number of Samples	78	20	98
	Percent of Samples	80	20	100
	Mean Length (mm)	742	838	760

*Note:* Sex ratios and average lengths include samples with unreadable scales.

Table 19.—Unalakleet River Chinook salmon escapement (caught in beach seines) age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2008.

Sampling date(s): 7/2-7/25 Sample Size: 125		Brood Year and (Age Group)				Totals
		2005	2004	2003	2002	
		(1.1)	(1.2)	(1.3)	(1.4)	
Male	Number of Samples	10	26	35	2	98
	Percent of Samples	10	27	36	2	78
	Mean Length (mm)	383	535	703	795	594
Female	Number of Samples			11	12	27
	Percent of Samples			12	13	22
	Mean Length (mm)			831	868	831
Total	Number of Aged Samples	10	26	46	14	96
	Percent of Samples	10	27	48	15	100
	Mean Length (mm)	383	535	725	857	645

*Note:* Sex ratios and average lengths include samples with unreadable scales.

Table 20.—Estimated escapement, total harvest, and total run compared to exploitation rate, Unalakleet River Chinook salmon, 1984–1986 and 1996–2008.

Year	Escapement <sup>a</sup>		Total		
	North River	Unalakleet River	Harvest <sup>b, c</sup>	Estimated Run Size	Exploitation Rate (Percent)
1984	2,844	7,368	9,999	17,367	57.6
1985	1,426	3,694	16,034	19,728	81.3
1986	1,613	4,179	8,437	12,615	66.9
<sup>d</sup>					
1996	1,197	3,101	7,051	10,152	69.5
1997	4,185	10,842	14,100	24,942	56.5
1998	2,100	5,440	10,992	16,432	66.9
1999	1,639	4,246	5,033	9,279	54.2
2000	1,046	2,710	3,356	6,066	55.3
2001 <sup>e</sup>	1,337	3,464	3,176	6,640	47.8
2002	1,484	3,845	2,915	6,760	43.1
2003	1,452	3,762	2,692	6,454	41.7
2004	1,125	2,915	3,185	6,100	52.2
2005	1,015	2,630	2,510	5,140	48.8
2006	906	2,347	2,842	5,189	54.8
2007	1,948	5,047	1,826	6,873	26.6
2008	903	2,339	2,047	4,386	46.7
Long-Term Average <sup>f</sup>	1,848	4,786	7,617	12,403	58.3
2004-2008 Average	1,179	3,055	2,482	5,537	45.8

<sup>a</sup> Drainagewide escapement estimate calculated by expanding tower counts by 0.386, the average proportion of Chinook salmon migrating into the North River, 1997 and 1998 (Wuttig 1999).

<sup>b</sup> The 1994–2001 average subsistence harvest of 3,041 Chinook was used for 1984–1986 harvest estimates.

<sup>c</sup> Sport fish harvest unavailable. Sport fish guide logbook harvest estimate of 50 Chinook substituted for 2008.

<sup>d</sup> North River Tower not operational from 1987 to 1995.

<sup>e</sup> Projected started late. Chinook salmon escapement underestimated in 2001.

<sup>f</sup> Previous 10-year average is from 1985 to 1986, and 1996 to 2003.

Table 21.—Chum salmon cumulative commercial catch and escapement data, Unalakleet Subdistrict, Norton Sound, 1985–2008.

Year	Commercial Fishery		Test Fishery		North River Tower Counts	Unalakleet River Drainage Aerial Surveys			
	Catch	CPUE	Catch	CPUE		North River	Old Woman River	Unalakleet River	Unalakleet and Old Woman Rivers
1985	25,111	20.20	916	44.75	4,567	1,625	510	1,640	2,150
1986	29,136	16.69	1,063	49.49	3,738	<sup>a</sup>	<sup>b</sup>	1,296	1,296
1987	17,525	10.94	707	29.61	<sup>c</sup>	392	139	484	623
1988	25,364	16.15	662	30.17	<sup>c</sup>	34	1,060	560	1,620
1989	20,825	17.01	856	40.76	<sup>c</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	
1990	23,659	14.62	383	19.08	<sup>c</sup>	1,345	510	2,580	3,090
1991	39,609	21.46	834	40.57	<sup>c</sup>	2,435	990	4,285	5,275
1992	52,547	26.60	976	44.97	<sup>c</sup>	0	<sup>b</sup>	<sup>b</sup>	
1993	28,156	19.37	700	32.27	<sup>c</sup>	445	70	<sup>b</sup>	70
1994	12,288	<sup>d</sup>	949	48.75	<sup>c</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	
1995	24,843	9.20	1,212	58.29	<sup>c</sup>	1,370	470	5,610	6,080
1996	7,369	<sup>d</sup>	1,635	87.43	9,789	540	296	<sup>b</sup>	296
1997	17,139	6.18	832	39.34	6,904	9,045	170	4,670	4,840
1998	6,210	<sup>d</sup>	535	25.44	1,526	50	180	1,050	1,230
1999	5,700	<sup>d</sup>	1,022	49.90	5,600	1,480	5	<sup>b</sup>	5
2000	2,700	20.01	1,075	48.94	4,971	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	
2001	1,512	9.25	645	29.22	6,515	330	<sup>b</sup>	<sup>b</sup>	
2002	340	<sup>d</sup>	852	36.42	5,918	217	236	1,099	1,335
2003	3,075	<sup>d</sup>	458	23.35	9,859	222	<sup>b</sup>	652	652
2004	4,925	<sup>d</sup>	976	41.67	10,036	283	80	340	420
2005	3,192	<sup>d</sup>	1,209	56.74	11,984	310	525	1,005	1,530
2006	6,721	<sup>d</sup>	1,482	61.75	5,385	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	
2007	11,788	12.06	978	42.92	8,151	295	95	1,807	1,902
2008	17,648	29.03	1,931	87.16	9,502	<sup>b</sup>	127	782	909
Average 1985-2001 <sup>a, e</sup>	19,982	15.98	882	42.29	5,451	1,469	400	2,464	2,415

<sup>a</sup> North River Tower historical average is from 1985 to 1986 and 1996 to 2001.

<sup>b</sup> Early, late, or poor survey conditions, or survey not flown.

<sup>c</sup> North River Tower Project was not conducted.

<sup>d</sup> There were no directed chum salmon openings so cumulative CPUE was not calculated.

<sup>e</sup> Historical average for commercial CPUEs from 1985 to 2001 excluding 1994, and 1996 to 1999.

Table 22.—Commercial salmon harvest and cumulative (Cum.) catch per unit effort (CPUE), Unalakleet Subdistrict, Norton Sound, 2007.

Period	Target Species	Dates Fished	Hours Fished	Permits Fished	Chinook Salmon			Coho Salmon			Chum Salmon		
					Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE
1	Chum	7/18-7/19	24	30	3	<sup>a</sup>	<sup>a</sup>	2,596	3.61	3.61	1,050	1.46	1.46
2	Chum	7/20-7/21	24	19	1	<sup>a</sup>	<sup>a</sup>	1,948	4.27	7.88	953	2.09	3.55
3	Coho	7/22-7/24	48	19	3	<sup>a</sup>	<sup>a</sup>	3,961	4.34	12.22	1,858	2.04	5.59
4	Coho	7/25-7/27	48	21	0	<sup>a</sup>	<sup>a</sup>	11,667	11.57	23.79	1,561	1.55	7.14
5	Coho	7/29-7/31	48	33	1	<sup>a</sup>	<sup>a</sup>	18,235	11.51	35.30	2,371	1.50	8.64
6	Coho	8/01-8/02	24	29	0	<sup>a</sup>	<sup>a</sup>	7,508	10.79	46.09	<sup>b</sup>	<sup>b</sup>	8.64
7	Coho	8/05-8/06	24	18	1	<sup>a</sup>	<sup>a</sup>	2,269	5.25	51.34	162	0.38	9.02
8	Coho	8/07-8/08	24	31	0	<sup>a</sup>	<sup>a</sup>	5,827	7.83	59.17	437	0.59	9.61
9	Coho	8/09-8/11	48	35	0	<sup>a</sup>	<sup>a</sup>	5,937	3.53	62.70	418	0.25	9.86
10	Coho	8/12-8/14	48	34	1	<sup>a</sup>	<sup>a</sup>	10,843	6.64	69.34	1,252	0.77	10.63
11	Coho	8/15-8/17	48	35	0	<sup>a</sup>	<sup>a</sup>	5,379	3.20	72.54	542	0.32	10.95
12	Coho	8/19-8/21	48	34	0	<sup>a</sup>	<sup>a</sup>	2,708	1.66	74.20	281	0.17	11.12
13	Coho	8/22-8/24	48	27	1	<sup>a</sup>	<sup>a</sup>	1,592	1.23	75.43	123	0.09	11.21
14	Coho	8/26-8/28	48	24	1	<sup>a</sup>	<sup>a</sup>	3,975	3.45	78.88	282	0.24	11.45
15	Coho	8/29-8/31	48	21	0	<sup>a</sup>	<sup>a</sup>	2,066	2.05	80.93	181	0.18	11.63
16	Coho	9/02-9/04	48	21	0	<sup>a</sup>	<sup>a</sup>	1,229	1.22	82.15	197	0.20	11.83
17	Coho	9/05-9/07	48	11	1	<sup>a</sup>	<sup>a</sup>	657	1.24	83.39	120	0.23	12.06
Totals			600	47	13			88,397	83.39	83.39	11,788	12.06	12.06

*Note:* The buyer purchased 2,121 pink salmon for crab bait that were incidentally caught during periods 1 and 2.

<sup>a</sup> CPUE was not calculated as there were no directed Chinook salmon openings.

<sup>b</sup> The buyer did not purchase chum salmon during this fishing period.



Table 23.—Commercial salmon harvest and cumulative (Cum.) catch per unit effort (CPUE), Unalakleet Subdistrict, Norton Sound, 2008.

Period	Target Species	Dates Fished	Hours Fished	Permits Fished	Chinook Salmon			Pink Salmon			Coho Salmon			Chum Salmon		
					Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE
1	Pink	7/08	6	8	3	<sup>a</sup>	<sup>a</sup>	6,029	125.60	125.60	1	0.02	0.02	52	1.08	1.08
2	Pink	7/09	6	18	1	<sup>a</sup>	<sup>a</sup>	6,492	60.11	185.72	5	0.05	0.07	140	1.30	2.38
3	Pink	7/10	6	12	0	<sup>a</sup>	<sup>a</sup>	4,073	56.57	242.28	1	0.01	0.08	90	1.25	3.63
4	Pink	7/11	6	16	0	<sup>a</sup>	<sup>a</sup>	7,163	74.61	316.90	30	0.31	0.39	251	2.61	6.24
5	Pink	7/12	8	18	0	<sup>a</sup>	<sup>a</sup>	9,472	65.78	382.68	2	0.01	0.41	417	2.90	9.14
6	Pink	7/13	8	3	1	<sup>a</sup>	<sup>a</sup>	2,103	87.63	470.30	3	0.13	0.53	61	2.54	11.68
7	Pink	7/14	8	14	0	<sup>a</sup>	<sup>a</sup>	4,861	43.40	513.70	18	0.16	0.69	176	1.57	13.25
8	Pink	7/15	8	12	1	<sup>a</sup>	<sup>a</sup>	5,700	59.38	573.08	27	0.28	0.97	335	3.49	16.74
9	Chum	7/17-7/18	24	27	14	<sup>a</sup>	<sup>a</sup>	1,807	2.79	575.87	645	1.00	1.97	2,351	3.63	20.37
10	Coho	7/20-7/22	48	24	10	<sup>a</sup>	<sup>a</sup>	895	0.78	576.64	3,148	2.73	4.70	1,852	1.61	21.98
11	Coho	7/23-7/25	48	40	3	<sup>a</sup>	<sup>a</sup>	87	0.05	576.69	3,610	1.88	6.58	2,397	1.25	23.23
12	Coho	7/27-7/29	48	35	2	<sup>a</sup>	<sup>a</sup>	16	0.01	576.70	6,583	3.92	10.50	2,954	1.76	24.99
13	Coho	7/30-8/01	48	20	3	<sup>a</sup>	<sup>a</sup>				3,426	3.57	14.07	1,252	1.30	26.29
14	Coho	8/03-8/05	48	49	1	<sup>a</sup>	<sup>a</sup>				12,393	5.27	19.34	1,305	0.55	26.84
15	Coho	8/06-8/08	48	49	3	<sup>a</sup>	<sup>a</sup>				7,642	3.25	22.59	742	0.32	27.16
16	Coho	8/10-8/12	48	47	3	<sup>a</sup>	<sup>a</sup>				9,041	4.01	26.60	931	0.41	27.57
17	Coho	8/13-8/15	48	43	2	<sup>a</sup>	<sup>a</sup>				5,617	2.72	29.32	925	0.45	28.02
18	Coho	8/17-8/19	48	36	0	<sup>a</sup>	<sup>a</sup>				4,235	2.45	31.77	387	0.22	28.24
19	Coho	8/20-8/22	48	34	0	<sup>a</sup>	<sup>a</sup>				2,750	1.69	33.45	263	0.16	28.41
20	Coho	8/24-8/26	48	20	1	<sup>a</sup>	<sup>a</sup>				3,137	3.27	36.72	214	0.22	28.63
21	Coho	8/27-8/29	48	26	0	<sup>a</sup>	<sup>a</sup>				4,323	3.46	40.18	141	0.11	28.74
22	Coho	8/31-9/02	48	29	0	<sup>a</sup>	<sup>a</sup>				4,224	3.03	43.22	189	0.14	28.88
23	Coho	9/03-9/05	48	24	0	<sup>a</sup>	<sup>a</sup>				3,931	3.41	46.63	169	0.15	29.02
24	Coho	9/07-9/09	48	17	0	<sup>a</sup>	<sup>a</sup>				1,222	1.50	48.13	26	0.03	29.06
25	Coho	9/10-9/12	48	10	0	<sup>a</sup>	<sup>a</sup>				1,213	2.53	50.66	28	0.06	29.11
Totals			848	58	48			48,698	576.70		77,227	50.66		17,648	29.11	

Note: There were also 36 sockeye salmon harvested in the Unalakleet Subdistrict in 2008.

<sup>a</sup> CPUE was not calculated as there were no directed Chinook salmon openings.

Table 24.—Unalakleet River test fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2002.

		Brood Year and (Age Group)				Totals
		1999	1998	1997	1996	
Sampling Dates:	6/07-8/26	(0.2)	(0.3)	(0.4)	(0.5)	
Sample Size:	756					
Male	Number of Samples	8	280	213	29	530
	Percent of Samples	1	37	28	4	70
	Mean Length (mm)	565	602	610	626	605
Female	Number of Samples	3	90	119	14	226
	Percent of Samples	0	12	16	2	30
	Mean Length (mm)	572	592	600	603	593
Total	Number of Samples	11	370	332	43	756
	Percent of Samples	2	49	44	6	100
	Mean Length (mm)	568	599	607	618	602

Table 25.—Commercial fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2002.

		Brood Year and (Age Group)				Totals
		1999	1998	1997	1996	
Sampling Dates:	7/26-8/21	(0.2)	(0.3)	(0.4)	(0.5)	
Sample Size:	189					
Male	Number of Samples	5	61	19	1	86
	Percent of Samples	3	32	10	1	46
	Mean Length (mm)	565	615	621	650	614
Female	Number of Samples	4	61	34	4	103
	Percent of Samples	2	32	18	2	55
	Mean Length (mm)	545	574	598	625	582
Total	Number of Samples	9	122	53	5	189
	Percent of Samples	5	65	28	3	100
	Mean Length (mm)	556	594	606	630	596

Table 26.—Unalakleet River test fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2003.

		Brood Year and (Age Group)				Totals
		2000	1999	1998	1997	
Sampling Dates:	6/07-8/29	(0.2)	(0.3)	(0.4)	(0.5)	
Sample Size:	391					
Male	Number of Samples	1	263	43	9	316
	Percent of Samples	0	67	11	2	81
	Mean Length (mm)	630	588	617	603	592
Female	Number of Samples	1	62	11	1	75
	Percent of Samples	0	16	3	0	19
	Mean Length (mm)	580	585	621	665	591
Total	Number of Samples	2	325	54	10	391
	Percent of Samples	1	83	14	3	100
	Mean Length (mm)	605	587	620	610	592

Table 27.—Commercial fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2003.

Sampling Dates: 8/01-9/05 Sample Size: 235		Brood Year and (Age Group)		Totals
		1999	1998	
		(0.3)	(0.4)	
Male	Number of Samples	101	6	107
	Percent of Samples	43	3	46
	Mean Length (mm)	580	610	580
Female	Number of Samples	118	10	128
	Percent of Samples	50	4	55
	Mean Length (mm)	563	594	558
Total	Number of Samples	219	16	235
	Percent of Samples	93	7	100
	Mean Length (mm)	570	600	572

Table 28.—Unalakleet River test fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2004.

Sampling Dates: 6/23-9/09 Sample Size: 920		Brood Year and (Age Group)				Totals
		2001	2000	1999	1998	
		(0.2)	(0.3)	(0.4)	(0.5)	
Male	Number of Samples	25	230	454	1	710
	Percent of Samples	3	25	49	0	77
	Mean Length (mm)	568	591	613	585	604
Female	Number of Samples	1	48	161		210
	Percent of Samples	0	5	18		23
	Mean Length (mm)	537	589	599		596
Total	Number of Samples	26	278	615	1	920
	Percent of Samples	3	30	67	0	100
	Mean Length (mm)	566	590	609	585	602

Table 29.—Commercial fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2004.

Sampling Dates: 7/27-8/12 Sample Size: 286		Brood Year and (Age Group)			Totals
		2001	2000	1999	
		(0.2)	(0.3)	(0.4)	
Male	Number of Samples	12	60	92	164
	Percent of Samples	4	21	32	57
	Mean Length (mm)	558	574	600	588
Female	Number of Samples	10	30	82	122
	Percent of Samples	4	11	29	43
	Mean Length (mm)	546	567	580	574
Total	Number of Samples	22	90	174	286
	Percent of Samples	8	32	61	100
	Mean Length (mm)	552	572	591	582

Table 30.—Unalakleet River test fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2005.

		Brood Year and (Age Group)					Totals
		2002 (0.2)	2001 (0.3)	2000 (0.4)	1999 (0.5)	1998 (0.6)	
Sampling Dates:	6/10-9/07						
Sample Size:	1,069						
Male	Number of Samples	5	635	177	16	1	834
	Percent of Samples	1	59	17	2	0	78
	Mean Length (mm)	601	594	608	614	574	597
Female	Number of Samples		167	60	8		235
	Percent of Samples		16	6	1		22
	Mean Length (mm)		581	598	608		586
Total	Number of Samples	5	802	237	24	1	1,069
	Percent of Samples	1	75	22	2	0	100
	Mean Length (mm)	601	591	606	612	574	595

Table 31.—Commercial fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2005.

		Brood Year and (Age Group)				Totals
		2002 (0.2)	2001 (0.3)	2000 (0.4)	1999 (0.5)	
Sampling Dates:	7/24-8/06					
Sample Size:	234					
Male	Number of Samples	4	105	13		122
	Percent of Samples	2	45	6		52
	Mean Length (mm)	556	585	605		587
Female	Number of Samples	6	94	8	4	112
	Percent of Samples	3	40	3	2	48
	Mean Length (mm)	581	564	567	573	569
Total	Number of Samples	10	199	21	4	234
	Percent of Samples	4	85	9	2	100
	Mean Length (mm)	571	577	590	573	578

Table 32.—Unalakleet River test fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2006.

		Brood Year and (Age Group)				Totals
		2003 (0.2)	2002 (0.3)	2001 (0.4)	2000 (0.5)	
Sampling Dates:	6/14-8/30					
Sample Size:	1,443					
Male	Number of Samples	4	300	765	13	1,082
	Percent of Samples	0	21	53	1	75
	Mean Length (mm)	535	584	604	603	598
Female	Number of Samples	2	77	278	4	361
	Percent of Samples	0	5	19	0	25
	Mean Length (mm)	551	575	591	614	587
Total	Number of Samples	6	377	1,043	17	1,443
	Percent of Samples	0	26	72	1	100
	Mean Length (mm)	540	582	601	605	595

Table 33.—Commercial fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2006.

		Brood Year and (Age Group)				Totals
		2003 (0.2)	2002 (0.3)	2001 (0.4)	2000 (0.5)	
Sampling Dates:	7/22-7/31					
Sample Size:	578					
Male	Number of Samples	12	139	161	3	312
	Percent of Samples	2	24	28	1	54
	Mean Length (mm)	558	577	585	552	573
Female	Number of Samples	2	106	158	1	266
	Percent of Samples	0	18	27	0	46
	Mean Length (mm)	528	563	572	563	573
Total	Number of Samples	14	245	319	4	578
	Percent of Samples	2	42	55	1	100
	Mean Length (mm)	554	571	579	555	573

Table 34.—Unalakleet River test fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2007.

		Brood Year and (Age Group)					Totals
		2004 (0.2)	2003 (0.3)	2002 (0.4)	2001 (0.5)	2000 (0.6)	
Sampling Dates:	6/14-9/06						
Sample Size:	914						
Male	Number of Samples		364	315	49	1	729
	Percent of Samples		40	35	5	0	80
	Mean Length (mm)		580	595	601	633	588
Female	Number of Samples	1	93	77	14		185
	Percent of Samples	0	10	8	2		20
	Mean Length (mm)	530	572	587	584		579
Total	Number of Samples	1	457	392	63	1	914
	Percent of Samples	0	50	43	7	0	100
	Mean Length (mm)	530	579	594	597	633	586

Table 35.—Commercial fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2007.

		Brood Year and (Age Group)			Totals
		2003 (0.3)	2002 (0.4)	2001 (0.5)	
Sampling Dates:	7/19-7/27				
Sample Size:	301				
Male	Number of Samples	125	53	11	189
	Percent of Samples	42	18	4	63
	Mean Length (mm)	573	586	613	579
Female	Number of Samples	63	43	6	112
	Percent of Samples	21	14	2	37
	Mean Length (mm)	562	574	581	568
Total	Number of Samples	188	96	17	301
	Percent of Samples	63	32	6	100
	Mean Length (mm)	569	580	601	575

Table 36.—Unalakleet River test fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2008.

		Brood Year and (Age Group)				Totals
		2004	2003	2002	2001	
Sampling Dates:	6/11-8/09	(0.3)	(0.4)	(0.5)	(0.6)	
Sample Size:	480					
Male	Number of Samples	103	215	29	1	365
	Percent of Samples	23	47	6	0	76
	Mean Length (mm)	586	603	607	585	598
Female	Number of Samples	44	53	11		115
	Percent of Samples	10	12	2		24
	Mean Length (mm)	579	583	594		582
Total	Number of Aged Samples	147	268	40	1	456
	Percent of Samples	32	59	9	0	100
	Mean Length (mm)	584	600	604	585	594

*Note:* Percentages and total average lengths by sex include samples with unreadable scales.

Table 37.—Commercial fishery chum salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2008.

		Brood Year and (Age Group)			Totals
		2004	2003	2002	
Sampling Dates:	7/09-8/19	(0.3)	(0.4)	(0.5)	
Sample Size:	200				
Male	Number of Samples	41	51	5	102
	Percent of Samples	21	27	3	51
	Mean Length (mm)	576	585	581	581
Female	Number of Samples	52	35	8	98
	Percent of Samples	27	18	4	49
	Mean Length (mm)	553	572	576	561
Total	Number of Aged Samples	93	86	13	192
	Percent of Samples	48	45	7	100
	Mean Length (mm)	563	580	578	571

*Note:* Percentages and total average lengths by sex include samples with unreadable scales.

Table 38.—Estimated escapement, total harvest, and total run compared to exploitation rate, Unalakleet River chum salmon, 1984–1986 and 1996–2008.

Year	Escapement <sup>a</sup>		Total		
	North River	Unalakleet River	Harvest <sup>b, c</sup>	Estimated Run Size	Exploitation Rate (Percent)
1984	2,915	21,123	46,665	67,788	68.8
1985	4,567	33,094	27,079	60,173	45.0
1986	3,738	27,087	30,239	57,326	52.7
<sup>d</sup>					
1996	9,789	70,935	11,596	89,677	12.9
1997	6,904	50,029	18,742	59,277	31.6
1998	1,526	11,058	9,248	20,450	45.2
1999	5,600	40,580	9,392	46,280	20.3
2000	4,971	36,022	5,700	40,452	14.1
2001	6,515	47,210	4,430	51,426	8.6
2002	5,918	42,884	4,216	47,744	8.8
2003	9,859	71,442	4,860	78,520	6.2
2004	10,036	73,794	7,078	79,646	8.9
2005	11,984	118,653	5,852	128,086	4.6
2006	5,397	30,492	9,433	44,337	21.3
2007	8,151	59,066	13,845	79,519	17.4
2008	9,502	68,855	20,453	68,855	29.7
Long-Term Average <sup>e</sup>	5,686	41,302	15,241	55,371	28.2
2004–2008 Average	9,014	70,172	12,396	80,089	16.4

<sup>a</sup> Drainagewide escapement estimates for the 2004–2006 seasons calculated by expanding tower counts by North River proportional abundance estimates determined from radiotelemetry (0.136, 0.101, and 0.177, respectively). Drainagewide escapements estimated for all other years by expanding tower counts by the 2004–2006 average proportion (0.138) of chum salmon migrating into the North River (Estensen and Balland *In prep*).

<sup>b</sup> The 1994–1998 average subsistence harvest of 3,764 chum salmon was used for 1984–1986 harvest estimates.

<sup>c</sup> Harvest includes commercial, subsistence, sport and Unalakleet River test fishery catches from 1984 to 1986 and 1996 to 2007. Sport fish harvest unavailable for 2008. The recent 5-year (2003–2007) average harvest of 117 chum salmon was substituted.

<sup>d</sup> North River Tower not operational from 1987 to 1995.

<sup>e</sup> Average is from 1985 to 1986, and 1996 to 2003.

Table 39.—Pink salmon cumulative commercial catch and escapement data, Unalakleet Subdistrict, Norton Sound, 1985–2008.

Unalakleet River Drainage Aerial Surveys									
Commercial Fishery			Test Fishery		North River Tower Counts	Unalakleet and Old Woman Rivers			
Year	Catch	CPUE	Catch	CPUE		North River	Old Woman River	Unalakleet River	
1985	1	<sup>a</sup>	17	0.68	4,360	730		<sup>b</sup>	<sup>b</sup>
1986	<sup>a</sup>	<sup>a</sup>	838	39.72	236,487		<sup>b</sup>	<sup>b</sup>	<sup>b</sup>
1987	97	<sup>a</sup>	105	4.11	<sup>c</sup>	<sup>b</sup>	<sup>b</sup>		<sup>b</sup>
1988	23,730	77.40	1,066	49.52	<sup>c</sup>	112,770	63,170	85,000	148,170
1989	<sup>a</sup>	<sup>a</sup>	1,420	72.74	<sup>c</sup>	<sup>b</sup>	<sup>b</sup>		<sup>b</sup>
1990	<sup>a</sup>	<sup>a</sup>	831	41.64	<sup>c</sup>	25,685	3,295	19,670	22,965
1991	<sup>a</sup>	<sup>a</sup>	473	19.44	<sup>c</sup>	119,140	1,964	44,300	46,264
1992	6,284	<sup>d</sup>	2,149	96.50	<sup>c</sup>	631,140		<sup>b</sup>	<sup>b</sup>
1993	42,061	77.30	219	10.26	<sup>c</sup>	13,570	70	<sup>b</sup>	70
1994	480,158	68.28	4,221	264.59	<sup>c</sup>	<sup>b</sup>	<sup>b</sup>		<sup>b</sup>
1995	37,009	304.17	250	13.57	<sup>c</sup>	18,300		1,950	1,950
1996	113,837	861.98	2,412	115.52	332,539	125,500	16,390	<sup>b</sup>	16,390
1997	<sup>a</sup>	<sup>a</sup>	510	24.94	127,926	17,870		<sup>b</sup>	3,655
1998	99,412	681.54	529	25.79	74,045	153,150	14,410	23,730	38,140
1999	<sup>a</sup>	<sup>a</sup>	365	16.40	48,993	3,790	<sup>b</sup>		<sup>b</sup>
2000	17,277	151.69	216	10.44	69,703	<sup>b</sup>	<sup>b</sup>		<sup>b</sup>
2001	<sup>a</sup>	<sup>a</sup>	427	21.68	24,737	<sup>b</sup>	<sup>b</sup>		<sup>b</sup>
2002	<sup>a</sup>	<sup>a</sup>	1,886	78.89	321,756	45,950	<sup>b</sup>	6,635	<sup>b</sup>
2003	<sup>a</sup>	<sup>a</sup>	3,784	183.73	280,212	11,010	<sup>b</sup>		<sup>b</sup>
2004	<sup>a</sup>	<sup>a</sup>	1,863	76.54	1,162,978	264,000	<sup>b</sup>	44,018	<sup>b</sup>
2005	<sup>a</sup>	<sup>a</sup>	3,952	192.48	1,670,934	381,150	29,250	<sup>b</sup>	201,514
2006	<sup>a</sup>	<sup>a</sup>	7,599	316.63	2,169,890	<sup>b</sup>	<sup>b</sup>		<sup>b</sup>
2007	2,121	<sup>a</sup>	1,471	63.79	580,929	50,100	2,745	65,700	68,445
2008	48,698	575.94	2,792	121.87	241,471	325	<sup>b</sup>	340	<sup>b</sup>
Average 1985-2001 <sup>e, f</sup>	81,987	317.48	944	48.68	114,849	111,059	16,550	29,718	34,701

<sup>a</sup> There were no directed pink salmon openings, so cumulative CPUE was not calculated.

<sup>b</sup> Early, late, or poor survey conditions, or survey not flown.

<sup>c</sup> North River Tower project was not conducted.

<sup>d</sup> Commercial CPUE unavailable due to lack of fishing effort data.

<sup>e</sup> Historical average for the commercial catch and commercial CPUE is from 1985 to 2000.

<sup>f</sup> North River Tower average is from 1985 to 1986 and 1996 to 2001.



Table 40.—Commercial salmon harvest and cumulative (Cum.) catch per unit effort (CPUE) by fishing period, Unalakleet Subdistrict, Norton Sound, 2002.

Period	Target Species	Dates Fished	Hours Fished	Permits Fished	Chinook Salmon			Coho Salmon			Chum Salmon		
					Harvest	Cum.		Harvest	Cum.		Harvest	Cum.	
						CPUE	CPUE		CPUE	CPUE		CPUE	CPUE
1	Coho	7/25-7/26	24	2	1	a	a	11	0.23	0.23	114	2.38	2.38
2	Coho	7/29-7/30	24	1	1	a	a	76	3.17	3.40	79	3.29	5.67
3	Coho	8/01-8/02	24	1	0	a	a	131	5.46	8.86	38	1.58	7.25
4	Coho	8/05-8/06	24	3	1	a	a	147	2.04	10.90	26	0.36	7.61
5	Coho	8/08-8/09	24	2	1	a	a	560	11.67	22.57	58	1.21	8.82
6	Coho	8/12-8/13	24	2	0	a	a	66	1.38	23.95	10	0.21	9.03
7	Coho	8/15-8/16	24	No Fishing Effort (Storm Conditions)									
8	Coho	8/19/8/20	24	1	0	a	a	93	3.88	27.83	15	0.00	9.03
Totals			168	5	4			1,084	27.83	27.83	340	9.03	9.03

Note: There was 1 sockeye salmon harvested in 2002.

<sup>a</sup> CPUE was not calculated as there were no directed Chinook salmon openings.

Table 41.—Commercial salmon harvest and cumulative (Cum.) catch per unit effort (CPUE) by fishing period, Unalakleet Subdistrict, Norton Sound, 2003.

Period	Target Species	Dates Fished	Hours Fished	Permits Fished	Chinook Salmon			Coho Salmon			Chum Salmon		
					Harvest	Cum.		Harvest	Cum.		Harvest	Cum.	
						CPUE	CPUE		CPUE	CPUE		CPUE	CPUE
1	Coho	7/31-8/01	24	3	0	a	a	397	5.51	5.51	212	2.94	2.94
2	Coho	8/04-8/06	48	12	2	a	a	2,431	4.22	9.73	743	1.29	4.23
3	Coho	8/07-8/09	48	16	2	a	a	1,694	2.21	11.94	492	0.64	4.88
4	Coho	8/11-8/13	48	10	0	a	a	1,004	2.09	14.03	363	0.76	5.63
5	Coho	8/14-8/16	48	11	0	a	a	1,765	3.34	17.37	591	0.68	6.31
6	Coho	8/18-8/20	48	12	1	a	a	1,512	3.20	20.57	314	0.46	6.77
7	Coho	8/21-8/23	48	12	1	a	a	1,081	3.63	24.20	133	0.00	6.77
8	Coho	8/25-8/27	48	9	0	a	a	570	1.32	25.52	51	0.12	6.89
9	Coho	8/28-8/30	48	9	3	a	a	1,064	2.46	27.98	97	0.22	7.11
10	Coho	9/01-9/03	48	8	1	a	a	674	1.76	29.73	46	0.12	7.23
11	Coho	9/04-9/06	48	9	0	a	a	837	1.94	31.67	33	0.08	7.31
Totals			504	21	10			13,029	31.67	31.67	3,075	7.31	7.31

Note: There were 21 sockeye salmon harvested in 2003.

<sup>a</sup> CPUE was not calculated as there were no directed Chinook salmon openings.

Table 42.—Commercial salmon harvest and cumulative (Cum.) catch per unit effort (CPUE) by fishing period, Unalakleet Subdistrict, Norton Sound, 2004.

Period	Target Species	Permits Fished	Hours Fished	Permits Fished	Chinook Salmon			Coho Salmon			Chum Salmon		
					Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE
1	Coho	7/26-7/28	48	16	4	<sup>a</sup>	<sup>a</sup>	1,215	1.58	1.58	1,177	1.53	1.53
2	Coho	7/29-7/31	48	17	15	<sup>a</sup>	<sup>a</sup>	2,037	2.50	4.08	1,400	1.72	3.25
3	Coho	8/02-8/04	48	17	0	<sup>a</sup>	<sup>a</sup>	3,348	4.10	8.18	920	1.13	4.38
4	Coho	8/05-8/07	48	19	0	<sup>a</sup>	<sup>a</sup>	4,120	4.52	12.70	786	0.86	5.24
5	Coho	8/08-8/10	48	16	1	<sup>a</sup>	<sup>a</sup>	2,654	3.46	16.15	620	0.68	5.92
6	Coho	8/11-8/13	48	19	0	<sup>a</sup>	<sup>a</sup>	2,937	3.20	19.35	22	0.46	6.38
7	Coho	8/15-8/17	48	14	0	<sup>a</sup>	<sup>a</sup>	2,440	3.63	22.98	<sup>b</sup>	0.00	6.38
8	Coho	8/18-8/20	48	11	2	<sup>a</sup>	<sup>a</sup>	2,129	4.03	27.02	<sup>b</sup>	0.00	6.38
9	Coho	8/22-8/24	48	14	0	<sup>a</sup>	<sup>a</sup>	1,959	2.92	29.93	<sup>b</sup>	0.00	6.38
10	Coho	8/25-8/27	48	12	0	<sup>a</sup>	<sup>a</sup>	2,762	4.80	34.73	<sup>b</sup>	0.00	6.38
11	Coho	8/29-8/31	48	8	0	<sup>a</sup>	<sup>a</sup>	1,964	5.11	39.84	<sup>b</sup>	0.00	6.38
12	Coho	9/02-9/04	48	11	0	<sup>a</sup>	<sup>a</sup>	1,717	3.36	43.20	<sup>b</sup>	0.00	6.38
13	Coho	9/05-9/07	No buyer			No buyer			No buyer				
Totals			576	25	22			29,282	43.20	43.20	4,925	6.38	6.38

Note: There 47 sockeye salmon harvested from July 26 to August 17.

<sup>a</sup> CPUE was not calculated as there were no directed Chinook salmon openings.

<sup>b</sup> The buyer did not make any chum salmon purchases after period 6.

Table 43.—Commercial salmon harvest and cumulative (Cum.) catch per unit effort (CPUE) by fishing period, Unalakleet Subdistrict, Norton Sound, 2006.

Period	Target Species	Dates Fished	Hours Fished	Permits Fished	Chinook Salmon			Coho Salmon			Chum Salmon		
					Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE	Harvest	CPUE	Cum. CPUE
1	Coho	7/21-7/22	24	18	0	<sup>a</sup>	<sup>a</sup>	2,115	4.90	4.90	362	0.84	0.84
2	Coho	7/24-7/25	24	22	0	<sup>a</sup>	<sup>a</sup>	2,744	5.20	10.09	1,121	2.12	2.96
3	Coho	7/26-7/28	48	19	0	<sup>a</sup>	<sup>a</sup>	3,879	4.25	14.35	1,138	1.25	4.21
4	Coho	7/30-8/01	48	29	0	<sup>a</sup>	<sup>a</sup>	6,861	4.93	19.27	903	0.65	4.86
5	Coho	8/02-8/04	48	28	1	<sup>a</sup>	<sup>a</sup>	11,008	8.19	27.47	550	0.41	5.27
6	Coho	8/06-8/08	48	27	0	<sup>a</sup>	<sup>a</sup>	10,360	7.99	35.46	625	0.48	5.75
7	Coho	8/09-8/11	48	31	0	<sup>a</sup>	<sup>a</sup>	10,252	6.89	42.35	694	0.47	6.22
8	Coho	8/13-8/15	48	30	0	<sup>a</sup>	<sup>a</sup>	9,849	6.84	49.19	292	0.20	6.42
9	Coho	8/16-8/18	48	24	3	<sup>a</sup>	<sup>a</sup>	5,545	4.81	54.00	184	0.16	6.58
10	Coho	8/20-8/22	48	26	1	<sup>a</sup>	<sup>a</sup>	9,177	7.35	61.36	307	0.25	6.82
11	Coho	8/23-8/25	48	27	2	<sup>a</sup>	<sup>a</sup>	8,840	6.82	68.18	165	0.13	6.95
12	Coho	8/27-8/29	48	29	4	<sup>a</sup>	<sup>a</sup>	7,056	5.07	73.25	132	0.09	7.05
13	Coho	8/30-9/01	48	22	1	<sup>a</sup>	<sup>a</sup>	4,474	4.24	77.48	85	0.08	7.13
14	Coho	9/04-9/08	96	23	0	<sup>a</sup>	<sup>a</sup>	3,662	1.66	79.14	87	0.04	7.17
15	Coho	9/10-9/14	96	19	0	<sup>a</sup>	<sup>a</sup>	2,514	1.38	80.52	76	0.04	7.21
Totals			768	40	12			98,336	80.52	80.52	6,721	7.21	7.21

<sup>a</sup> CPUE was not calculated as there were no directed Chinook salmon openings.

Table 44.—Coho salmon cumulative commercial catch and escapement data, Unalakleet Subdistrict, Norton Sound, 1985-2008.

Year	Commercial Fishery		Test Fishery		North River Tower Counts	Unalakleet River Drainage Aerial Surveys			
	Catch	CPUE	Catch	CPUE		North River	Old Woman River	Unalakleet River	Unalakleet and Old Woman Rivers
1985	15,421	15.01	206	11.56	2,045	c	c	c	
1986	20,580	12.70	163	9.01	a	c	c	c	
1987	15,097	10.61	149	6.58	b	680 c	330	1,014 c	1,344
1988	24,232	11.18	216	9.26	b	240	198	931	1,129
1989	36,025	19.74	232	9.82	b	c	c	c	
1990	52,015	29.75	284	14.01	b	c	c	c	
1991	52,033	25.71	177	8.46	b	2,510 c	1,530	7,396	8,926
1992	84,449	40.98	455	24.92	b	398 c	24 c	c	
1993	26,290	21.45	156	7.28	b	1,397 c	c	c	
1994	71,019	29.32	297	14.13	b	c	c	c	
1995	31,280	23.43	213	9.13	b	690	818	1,784	2,602
1996	52,027	35.12	717	35.88	1,229	917	925	c	
1997	26,079	17.89	197	9.00	5,768	c	c	c	
1998	24,534	23.37	220	11.27	3,361	233	210	772	982
1999	10,264	23.17	206	10.46	4,792	533	37 c	78 c	115
2000	29,803	28.93	257	11.73	6,959	c	c	c	
2001	15,102	33.80	219	11.70	12,383	c	c	c	
2002	1,084	27.83	394	15.21	2,966	800	347	380	727
2003	13,029	31.67	267	11.13	5,837	c	c	c	
2004	29,282	43.20	829	36.13	11,187	1,386	1,086	3,281	4,367
2005	63,699	80.57	1,080	58.93	19,189	1,963	1,180	3,184	4,364
2006	98,336	80.52	1,738	72.42	9,835	c	c	c	
2007	88,397	83.39	1,087	52.71	19,965	2,349	c	5,868	5,868
2008	77,227	52.03	1,988	100.50	15,648	2,744	2,775	10,401	13,176
Average 1985-2001 <sup>d</sup>	34,485	23.66	257	12.60	6,407	844	509	2,379	2,997

<sup>a</sup> Funding for North River Tower was terminated on 7/18/86 which occurred before coho salmon runs.

<sup>b</sup> North River Tower Project was not conducted.

<sup>c</sup> Early, late, or poor survey conditions, or survey not flown.

<sup>d</sup> North River Tower historical average includes only 1985, 1999, and 2001 when the majority of the coho salmon run was counted.

Table 45.—Unalakleet River test fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2002.

		Brood Year and (Age Group)			Totals
		1999	1998	1997	
Sampling Dates:	7/24-9/08				
Sample Size:	327	(1.1)	(2.1)	(3.1)	
Male	Number of Samples	24	123	18	165
	Percent of Samples	7	38	6	51
	Mean Length (mm)	604	603	616	605
Female	Number of Samples	18	119	25	162
	Percent of Samples	6	36	8	50
	Mean Length (mm)	616	612	609	612
Total	Number of Samples	42	242	43	327
	Percent of Samples	13	74	13	100
	Mean Length (mm)	609	608	612	608

Table 46.—Commercial fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2002.

		Brood Year and (Age Group)			Totals
		1999	1998	1997	
Sampling Dates:	8/02-8/21				
Sample Size:	367	(1.1)	(2.1)	(3.1)	
Male	Number of Samples	9	190	20	219
	Percent of Samples	3	52	6	60
	Mean Length (mm)	577	575	591	576
Female	Number of Samples	5	121	22	148
	Percent of Samples	1	33	6	40
	Mean Length (mm)	588	575	583	576
Total	Number of Samples	14	311	42	367
	Percent of Samples	4	85	12	100
	Mean Length (mm)	581	575	587	576

Table 47.—Unalakleet River test fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2003.

		Brood Year and (Age Group)			Totals
		2000	1999	1998	
Sampling Dates:	7/28-9/07				
Sample Size:	213	(1.1)	(2.1)	(3.1)	
Male	Number of Samples	17	78	6	101
	Percent of Samples	8	37	3	47
	Mean Length (mm)	602	597	578	597
Female	Number of Samples	16	89	7	112
	Percent of Samples	8	42	3	53
	Mean Length (mm)	613	606	590	606
Total	Number of Samples	33	167	13	213
	Percent of Samples	16	78	6	100
	Mean Length (mm)	607	602	585	601

Table 48.—Commercial fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2003.

		Brood Year and (Age Group)			Totals
		2000	1999	1998	
Sampling Dates:	8/01-9/05				
Sample Size:	687	(1.1)	(2.1)	(3.1)	
Male	Number of Samples	39	238	27	304
	Percent of Samples	6	35	4	44
	Mean Length (mm)	592	601	595	599
Female	Number of Samples	40	305	38	383
	Percent of Samples	6	44	6	56
	Mean Length (mm)	607	590	594	592
Total	Number of Samples	79	543	65	687
	Percent of Samples	12	79	10	100
	Mean Length (mm)	600	595	595	595

Table 49.—Unalakleet River test fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2004.

		Brood Year and (Age Group)			Totals
		2001	2000	1999	
Sampling Dates:	7/11-9/10				
Sample Size:	527	(1.1)	(2.1)	(3.1)	
Male	Number of Samples	34	245	17	296
	Percent of Samples	7	47	3	56
	Mean Length (mm)	592	588	599	589
Female	Number of Samples	33	192	6	231
	Percent of Samples	6	36	1	44
	Mean Length (mm)	592	585	588	586
Total	Number of Samples	67	437	23	527
	Percent of Samples	13	83	4	100
	Mean Length (mm)	592	587	596	588

Table 50.—Commercial fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2004.

		Brood Year and (Age Group)			Totals
		2001	2000	1999	
Sampling Dates:	7/27-8/13				
Sample Size:	321	(1.1)	(2.1)	(3.1)	
Male	Number of Samples	11	188	8	207
	Percent of Samples	3	59	3	65
	Mean Length (mm)	557	560	596	579
Female	Number of Samples	7	101	6	114
	Percent of Samples	2	32	2	36
	Mean Length (mm)	552	563	577	568
Total	Number of Samples	18	289	14	321
	Percent of Samples	6	90	4	100
	Mean Length (mm)	555	561	588	562

Table 51.—Unalakleet River test fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2005.

		Brood Year and (Age Group)			Total
		2002	2001	2000	
Sampling Dates:	7/01-9/09	(1.1)	(2.1)	(3.1)	
Sample Size:	776				
Male	Number of Samples	69	337	11	417
	Percent of Samples	9	44	1	54
	Mean Length (mm)	593	590	575	590
Female	Number of Samples	49	299	11	359
	Percent of Samples	6	39	1	46
	Mean Length (mm)	600	592	575	592
Total	Number of Samples	118	636	22	776
	Percent of Samples	15	82	3	100
	Mean Length (mm)	596	591	579	591

Table 52.—Commercial coho salmon fishery age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2005.

		Brood Year and (Age Group)			Total
		2002	2001	2000	
Sampling Dates:	7/24-9/02	(1.1)	(2.1)	(3.1)	
Sample Size:	540				
Male	Number of Samples	32	238	4	274
	Percent of Samples	6	44	1	51
	Mean Length (mm)	586	586	596	585
Female	Number of Samples	30	228	8	266
	Percent of Samples	6	42	2	49
	Mean Length (mm)	577	580	578	580
Total	Number of Samples	62	466	12	540
	Percent of Samples	12	86	2	100
	Mean Length (mm)	581	583	571	583

Table 53.—Unalakleet River test fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2006.

		Brood Year and (Age Group)			Total
		2003	2002	2001	
Sampling Dates:	7/01-9/14	(1.1)	(2.1)	(3.1)	
Sample Size:	1,188				
Male	Number of Samples	246	467	29	742
	Percent of Samples	21	39	2	63
	Mean Length (mm)	570	560	563	564
Female	Number of Samples	173	257	16	446
	Percent of Samples	15	22	1	38
	Mean Length (mm)	573	567	568	570
Total	Number of Samples	419	724	45	1,188
	Percent of Samples	35	61	4	100
	Mean Length (mm)	571	563	565	566

Table 54.—Commercial fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2006.

		Brood Year and (Age Group)			Total
		2003	2002	2001	
Sampling Dates:	7/22-9/13	(1.1)	(2.1)	(3.1)	
Sample Size:	1,001				
Male	Number of Samples	198	303	27	528
	Percent of Samples	20	30	3	53
	Mean Length (mm)	561	556	557	558
Female	Number of Samples	187	269	17	473
	Percent of Samples	19	27	2	47
	Mean Length (mm)	566	558	551	561
Total	Number of Samples	385	572	44	1,001
	Percent of Samples	39	57	4	100
	Mean Length (mm)	564	557	555	559

Table 55.—Unalakleet River test fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2007.

		Brood Year and (Age Group)			Total
		2004	2003	2002	
Sampling Dates:	7/14-9/09	(1.1)	(2.1)	(3.1)	
Sample Size:	619				
Male	Number of Samples	75	293	7	375
	Percent of Samples	12	47	1	61
	Mean Length (mm)	591	584	590	586
Female	Number of Samples	46	191	1	244
	Percent of Samples	7	31	1	39
	Mean Length (mm)	595	588	579	589
Total	Number of Samples	121	484	14	619
	Percent of Samples	20	78	2	100
	Mean Length (mm)	592	586	584	587

Table 56.—Commercial fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2007.

		Brood Year and (Age Group)			Total
		2004	2003	2002	
Sampling Dates:	7/19-9/06	(1.1)	(2.1)	(3.1)	
Sample Size:	769				
Male	Number of Samples	78	288	6	372
	Percent of Samples	10	38	1	48
	Mean Length (mm)	597	579	568	583
Female	Number of Samples	81	304	12	397
	Percent of Samples	11	40	2	52
	Mean Length (mm)	609	579	591	592
Total	Number of Samples	159	592	18	769
	Percent of Samples	21	77	2	100
	Mean Length (mm)	603	583	583	588

Table 57.—Unalakleet River test fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Norton Sound, 2008.

		Brood Year and (Age Group)			Total
		2005	2004	2003	
Sampling Dates:	7/07-9/12				
Sample Size:	291	(1.1)	(2.1)	(3.1)	
Male	Number of Samples	27	107	10	197
	Percent of Samples	12	46	4	68
	Mean Length (mm)	609	578	576	583
Female	Number of Samples	21	60	6	94
	Percent of Samples	9	26	3	32
	Mean Length (mm)	593	583	573	584
Total	Number of Aged Samples	48	167	16	231
	Percent of Samples	21	72	7	100
	Mean Length (mm)	602	580	574	584

*Note:* Percentages and total average lengths by sex include samples with unreadable scales.

Table 58.—Commercial fishery coho salmon age, sex, and mean length (mid eye to tail fork (METF)) composition, Unalakleet Subdistrict, Norton Sound, 2008.

		Brood Year and (Age Group)			Total
		2005	2004	2003	
Sampling Dates:	7/22-9/12				
Sample Size:	249	(1.1)	(2.1)	(3.1)	
Male	Number of Samples	10	59	7	133
	Percent of Samples	7	38	5	53
	Mean Length (mm)	602	572	569	580
Female	Number of Samples	25	41	12	116
	Percent of Samples	16	27	8	47
	Mean Length (mm)	589	565	581	574
Total	Number of Aged Samples	35	100	19	154
	Percent of Samples	23	65	12	100
	Mean Length (mm)	594	569	575	577

*Note:* Percentages and total average lengths by sex include samples with unreadable scales.



Table 59.—Estimated escapement, total harvest, and total run compared to exploitation rate, Unalakleet River coho salmon, 1996–2008.

Year	Escapement <sup>a</sup>		Total		
	North River	Unalakleet River	Harvest <sup>b</sup>	Estimated Run Size	Exploitation Rate (Percent)
1996	<sup>c</sup> 1,229	9,754	63,387	73,141	86.7
1997	<sup>c</sup> 5,768	45,778	32,825	78,603	41.8
1998	<sup>c</sup> 3,361	26,675	32,023	58,698	54.6
1999	4,792	38,032	18,404	56,436	32.6
2000	<sup>c</sup> 6,959	55,230	35,681	90,911	39.2
2001	12,383	98,278	21,372	119,650	17.9
2002	2,966	23,540	6,067	29,607	20.5
2003	5,837	46,325	19,219	65,544	29.3
2004	11,187	74,580	35,935	110,515	32.5
2005	19,189	137,064	71,323	208,387	34.2
2006	9,835	122,938	108,241	231,179	46.8
2007	19,965	158,448	94,256	252,704	37.3
2008	15,648	124,190	84,679	208,869	40.5
Long-Term Average <sup>d</sup>	5,412	42,951	28,622	71,574	40.3
2004-2008 Average	15,165	123,444	78,887	202,331	38.3

<sup>a</sup> Drainagewide escapement estimates for 2004–2006 seasons were calculated by expanding tower counts by North River proportional abundance estimates determined by radiotelemetry for the 2004–2006 seasons (0.152, 0.143, and 0.083, respectively). For all other years, tower counts were expanded by the North River 2004–2006 average proportional abundance estimate of 0.126 (Joy and Reed 2007).

<sup>b</sup> Harvest estimates include commercial, subsistence, sport, and Unalakleet River test fishery catches.

<sup>c</sup> Project operations terminated early and majority of the coho salmon run was not enumerated.

<sup>d</sup> Average is from 1996 to 2003.



## FIGURES

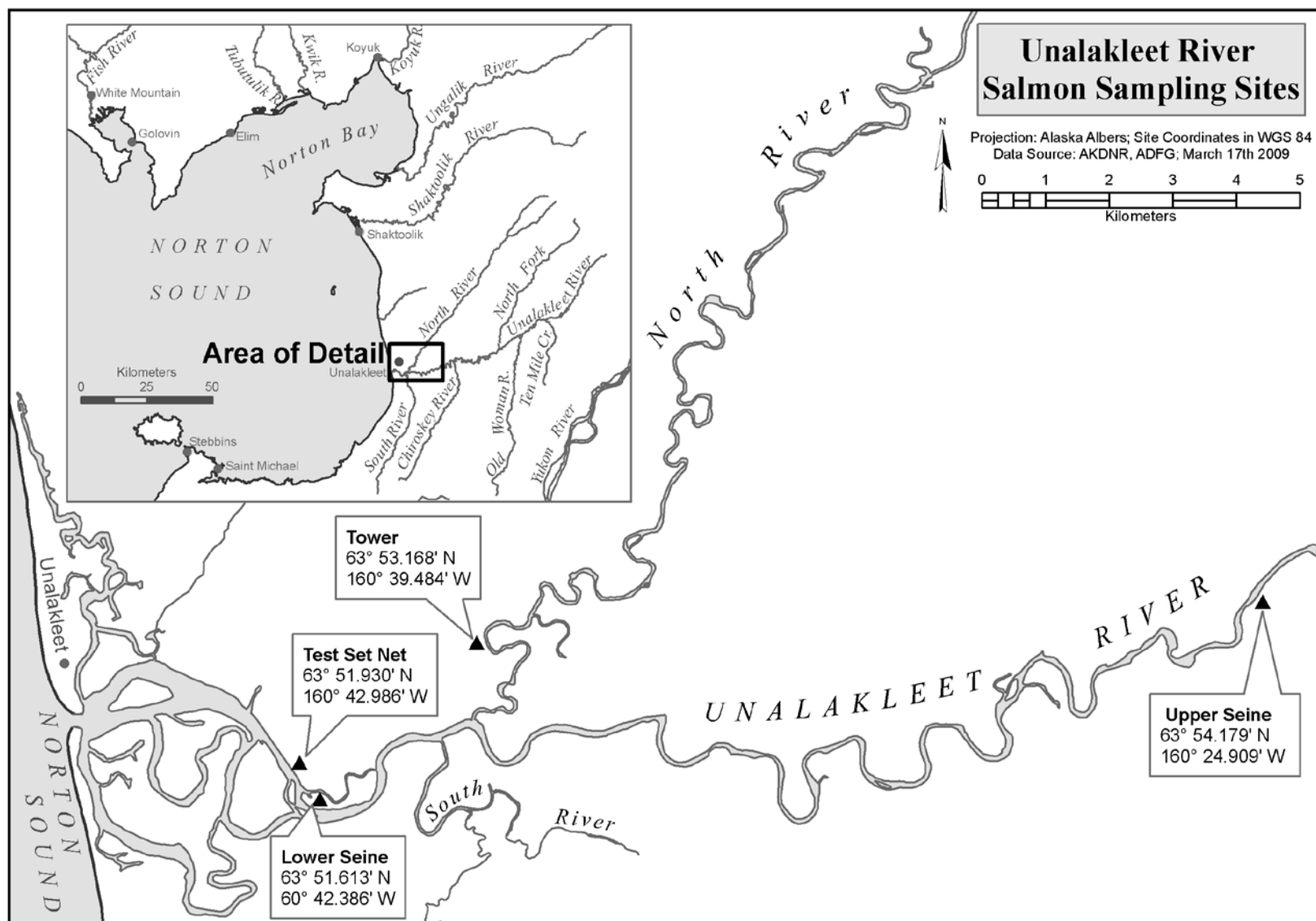


Figure 1.—Map showing the Native Village of Unalakleet, lower Unalakleet River drainage, and test net site, North River tower site, and Chinook salmon beach seining locations.

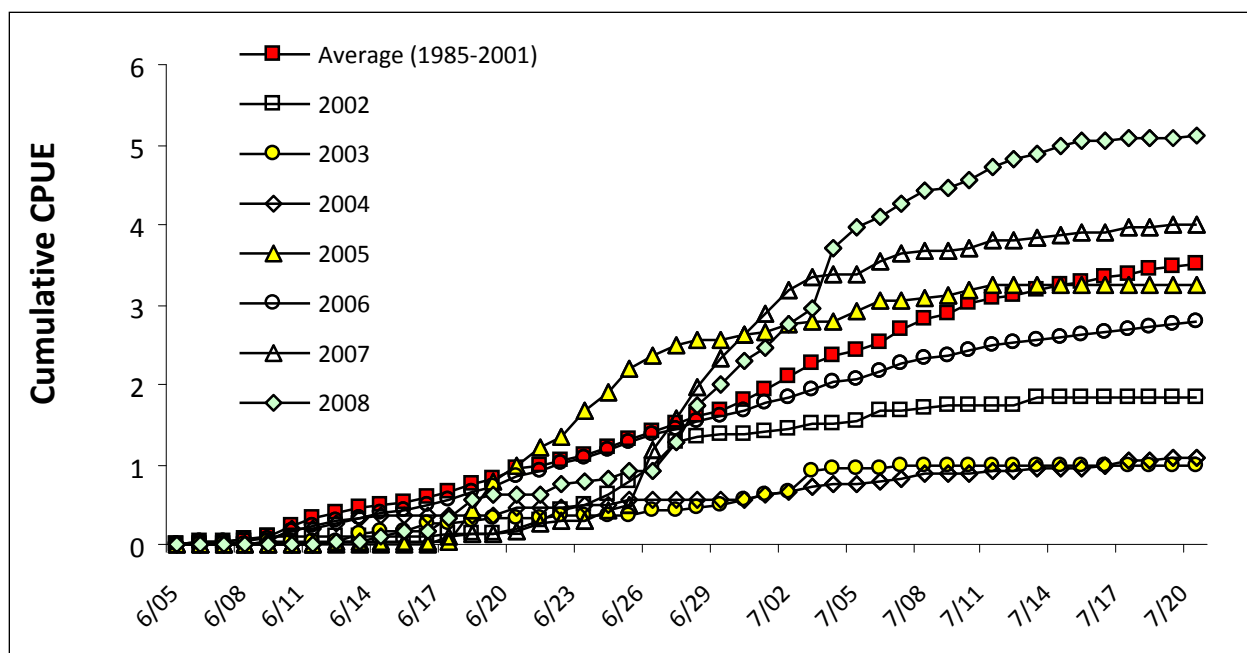


Figure 2.—Chinook salmon cumulative test fishing catch per unit effort (CPUE) by date compared to the historical average, Unalakleet River test net, Norton Sound, 2002–2008.

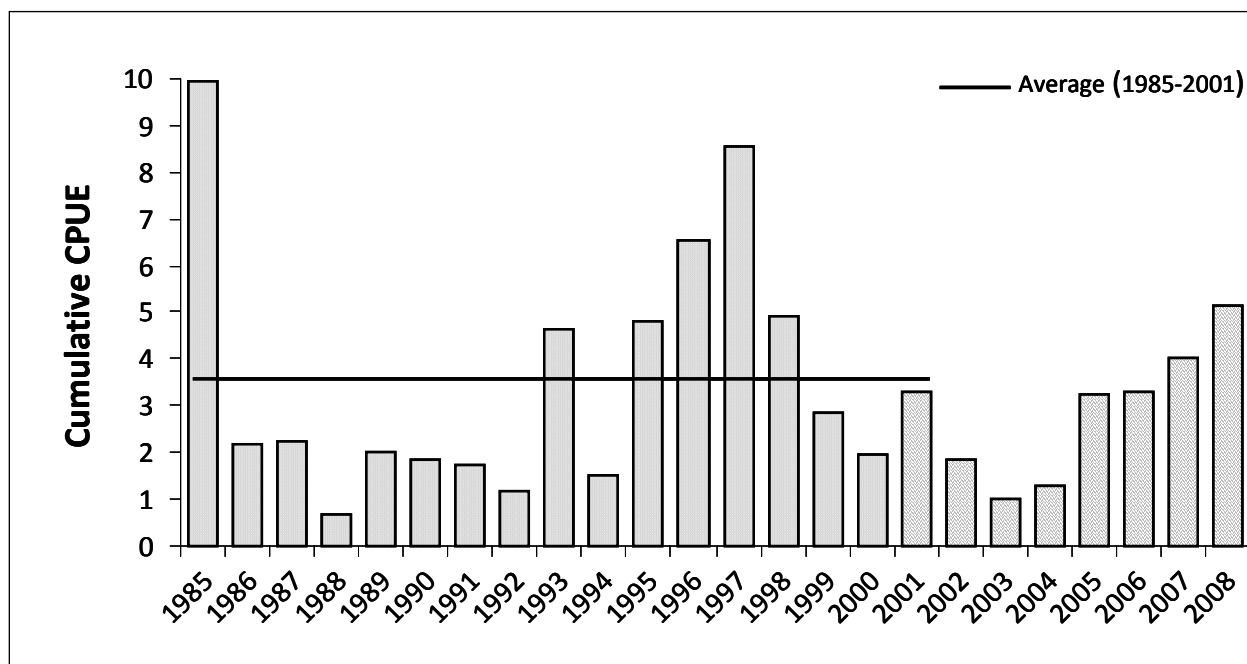


Figure 3.—Annual Chinook Salmon cumulative test fishing catch per unit effort (CPUE) compared to the historical average, Unalakleet River test net, Norton Sound, 1985–2008.

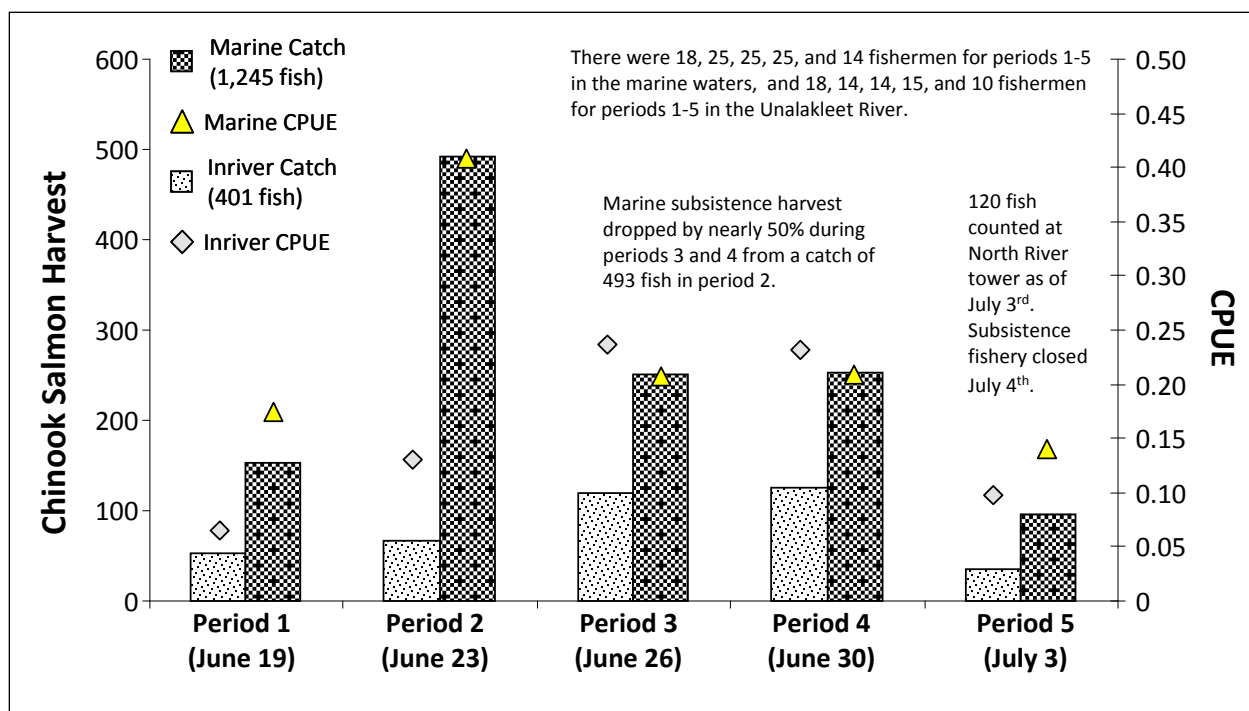


Figure 4.—Reported inseason marine and inriver Chinook salmon subsistence harvest and catch per unit of effort (CPUE) by period, 2007.

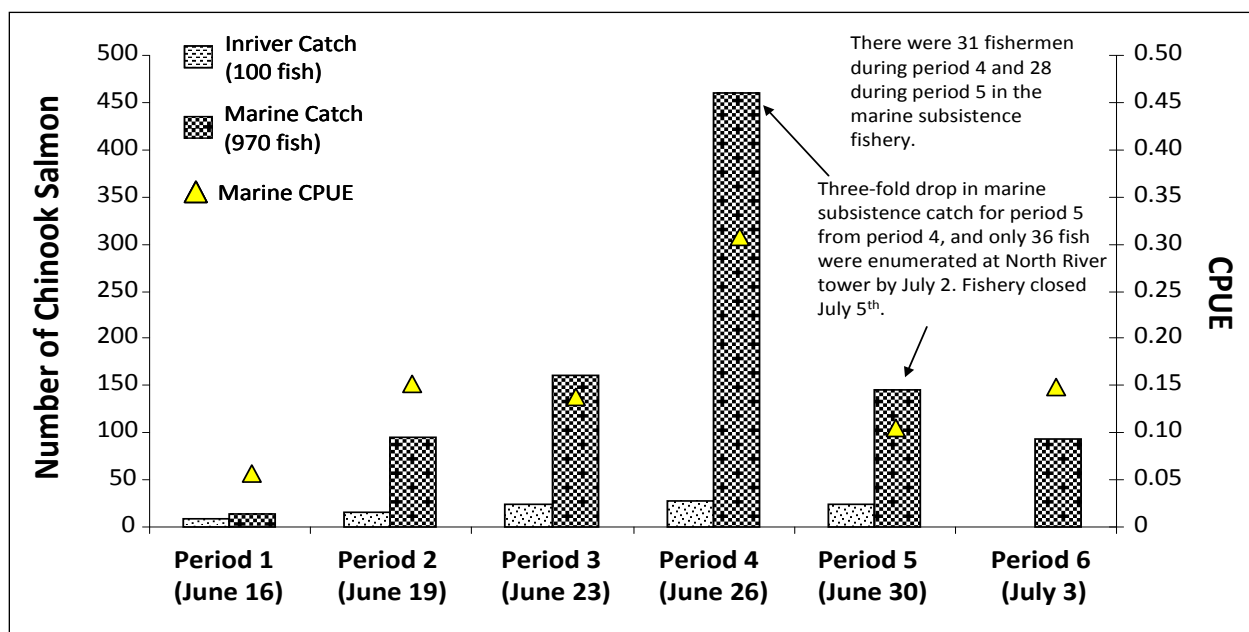


Figure 5.—Reported inseason marine and inriver Chinook salmon subsistence harvest and catch per unit of effort (CPUE) by period, 2008.

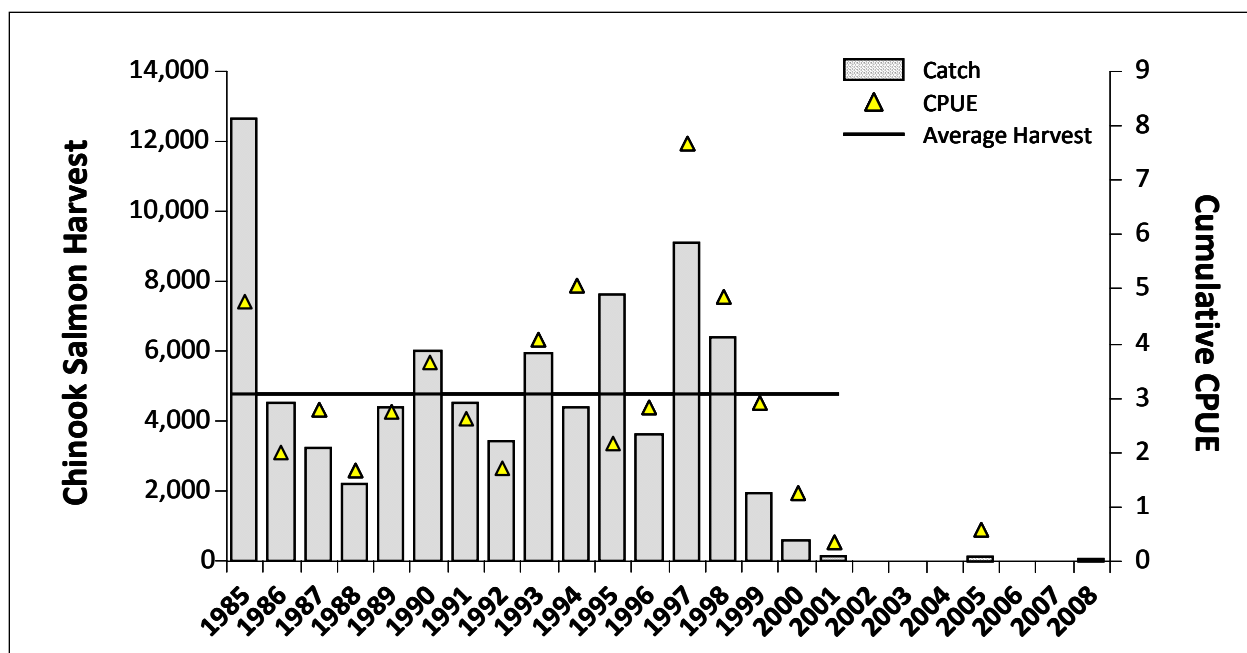


Figure 6.—Annual commercial Chinook salmon cumulative catch and catch per unit effort (CPUE) compared to the historical average, Unalakleet Subdistrict, Norton Sound, 1985–2008.

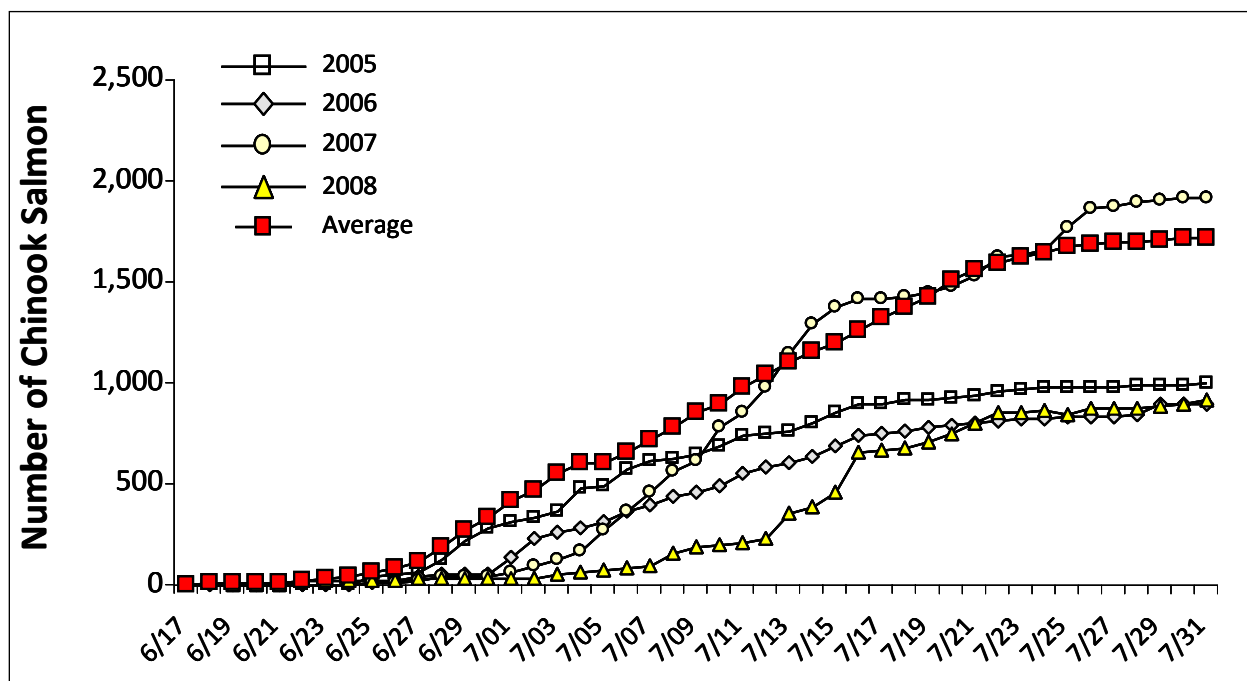


Figure 7.—Estimated cumulative Chinook salmon passage by date compared to the historical average (1996–2004), North River counting tower, North River, Unalakleet River drainage, Norton Sound, 2002–2008.

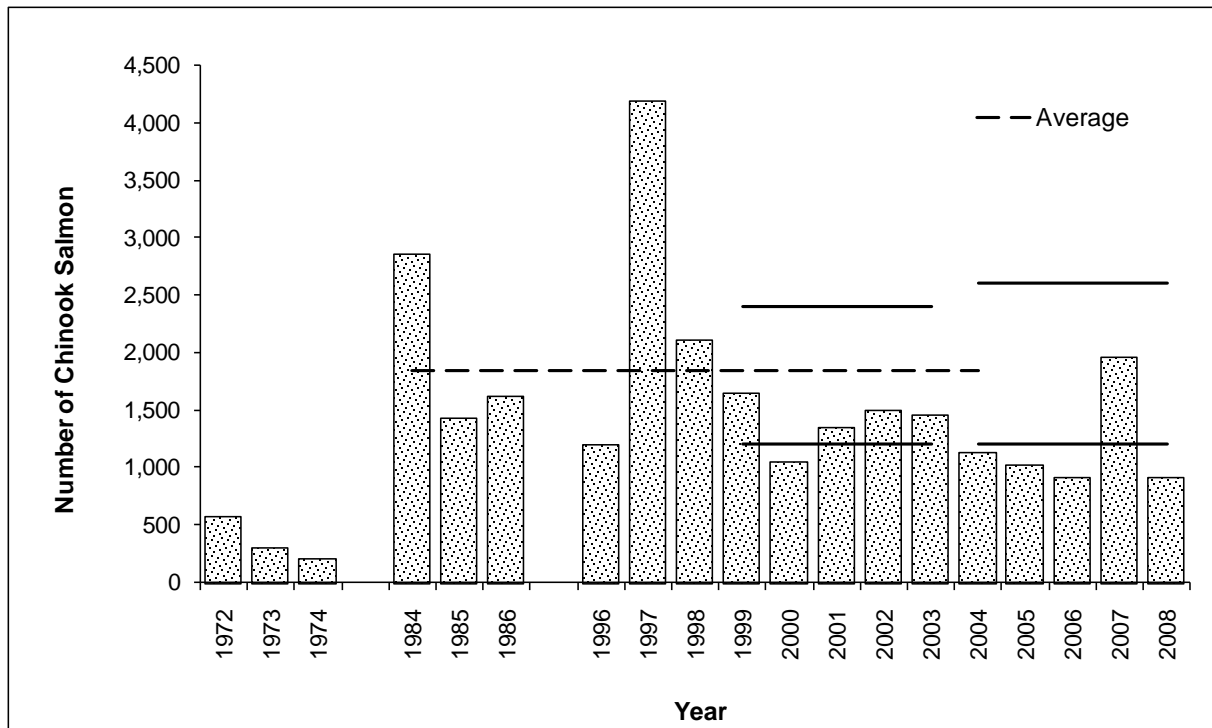


Figure 8.—Annual estimated Chinook salmon passage compared to the historical average (1984–1986, and 1996–2004) and escapement goal ranges at the North River counting tower, North River, Unalakleet River drainage, Norton Sound, 1972–1974, 1984–1986, and 1996–2008.

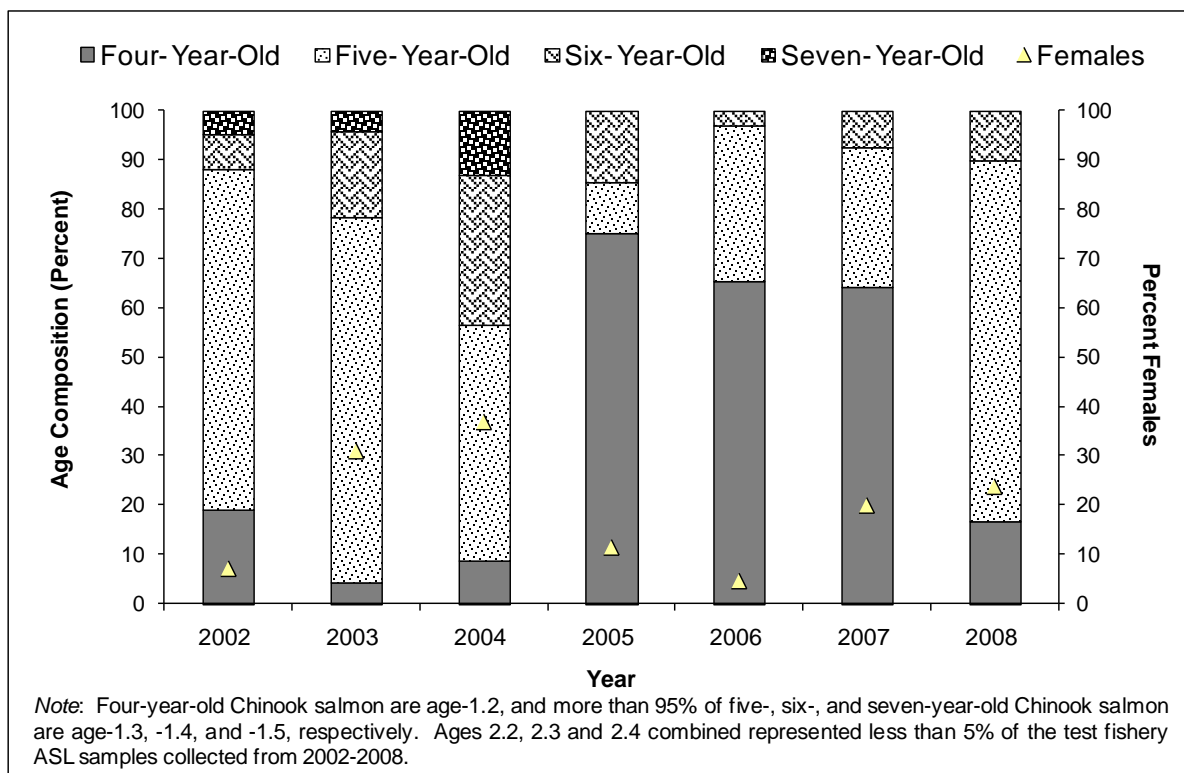


Figure 9.—Unalakleet River test fishery (5 $\frac{7}{8}$ -inch mesh) annual Chinook salmon age and sex structure, Norton Sound, 2002–2008.



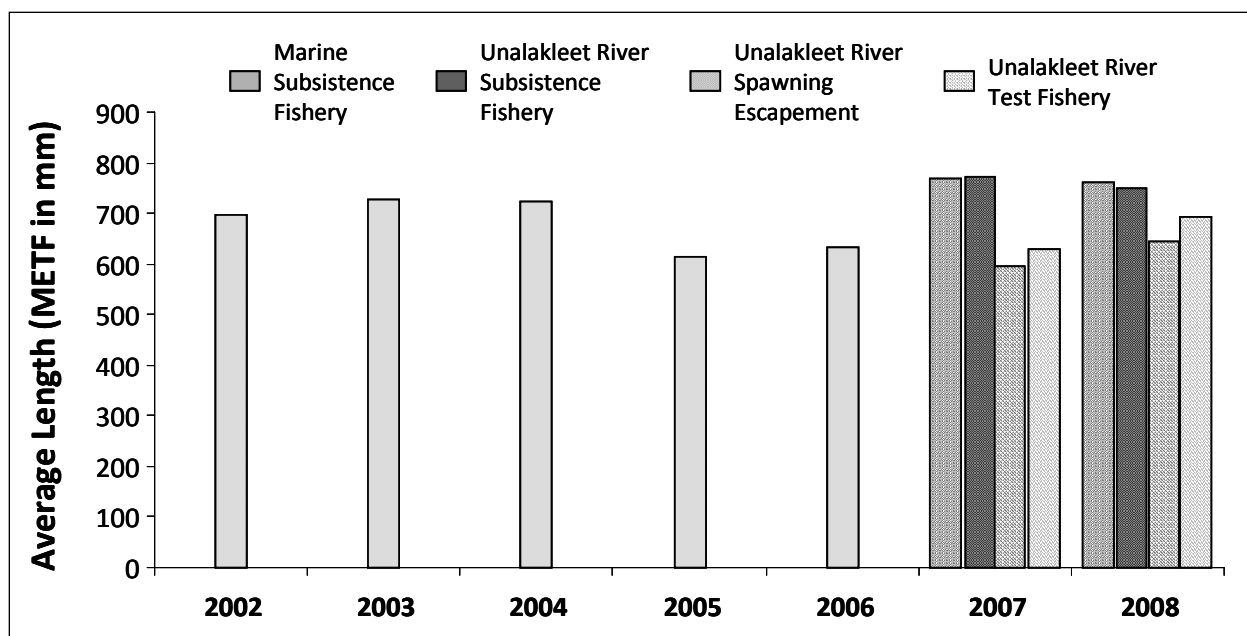


Figure 10.—Comparison of Chinook salmon average length (mid eye to tail fork (METF) in mm) from the marine and Unalakleet River subsistence fisheries (8-inch mesh), Unalakleet River test fishery (5 7/8-inch mesh), and spawning escapement (beach seined fish) Norton Sound, 2002–2008.

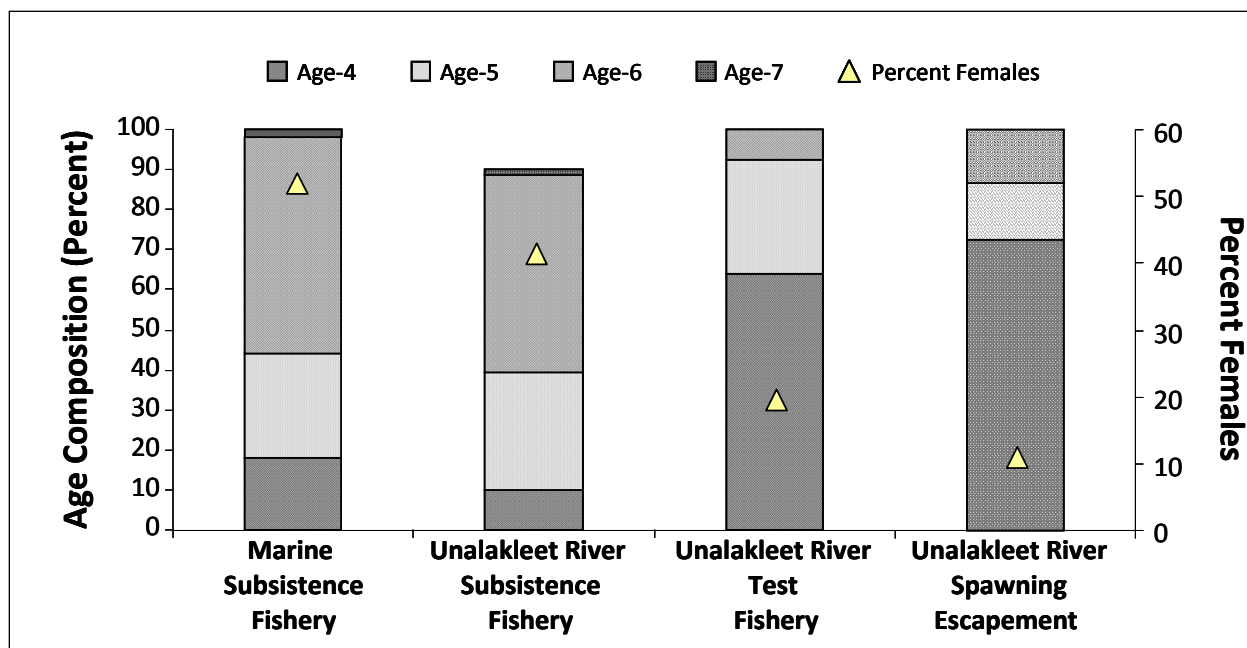


Figure 11.—Comparison of Chinook salmon age and sex structure from the marine and Unalakleet River subsistence fisheries (8-inch mesh), Unalakleet River test fishery (5 7/8-inch mesh), and spawning escapement (beach seined fish) Norton Sound, 2007.

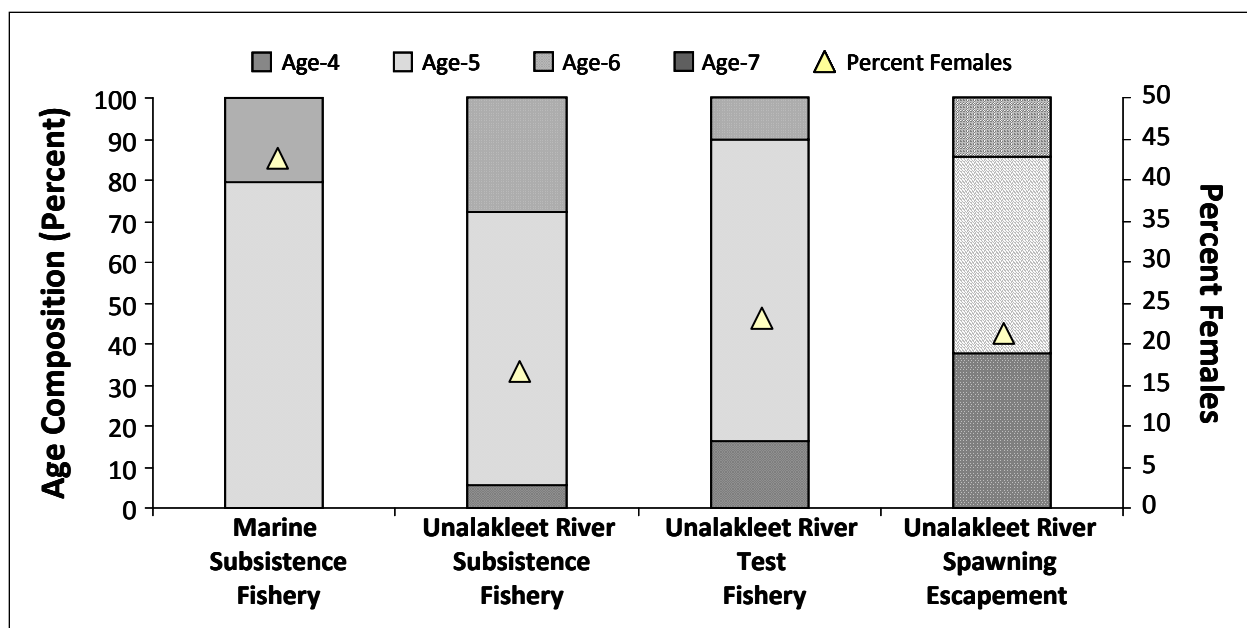
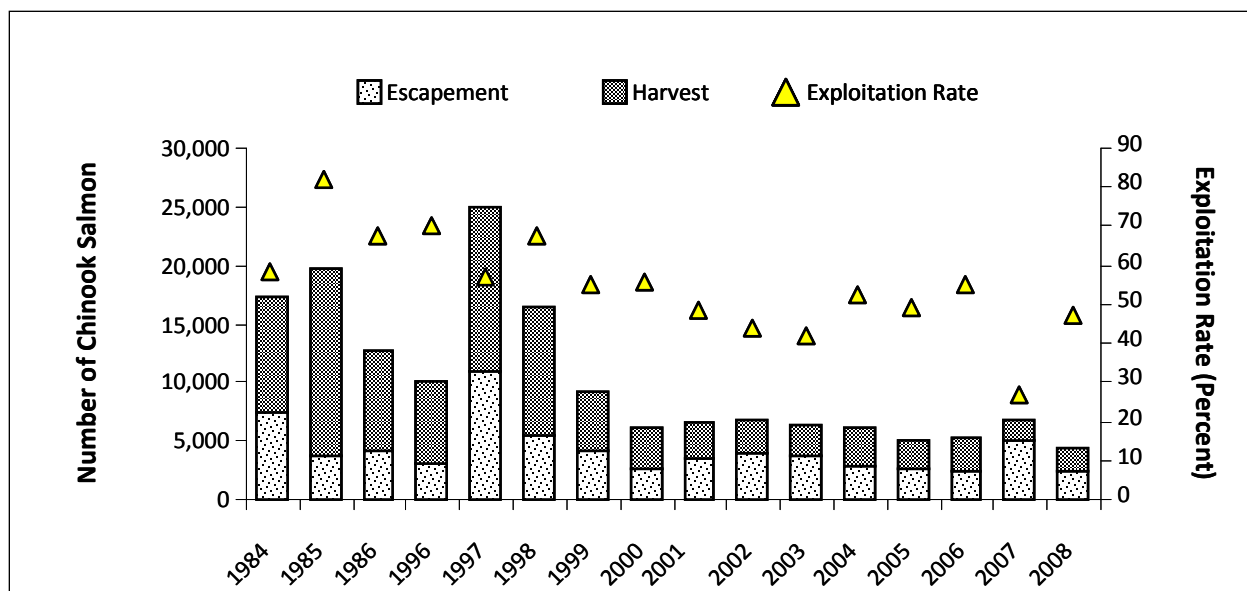


Figure 12.—Comparison of Chinook salmon age and sex structure from the marine and Unalakleet River subsistence fisheries (8-inch mesh), Unalakleet River test fishery (5 7/8-inch mesh), and spawning escapement (beach seined fish) Norton Sound, 2008.



Note: Unalakleet River drainagewide Chinook salmon escapements estimated by dividing the North River tower count cumulative Chinook salmon passage by the 1998-1999 average North River proportional abundance estimate of 0.386 determined by radiotelemetry (Wuttig 1999).

Figure 13.—Estimated escapement, total harvest, and total run compared to exploitation rate, Unalakleet River drainage Chinook salmon, 1984–1986 and 1996–2008.

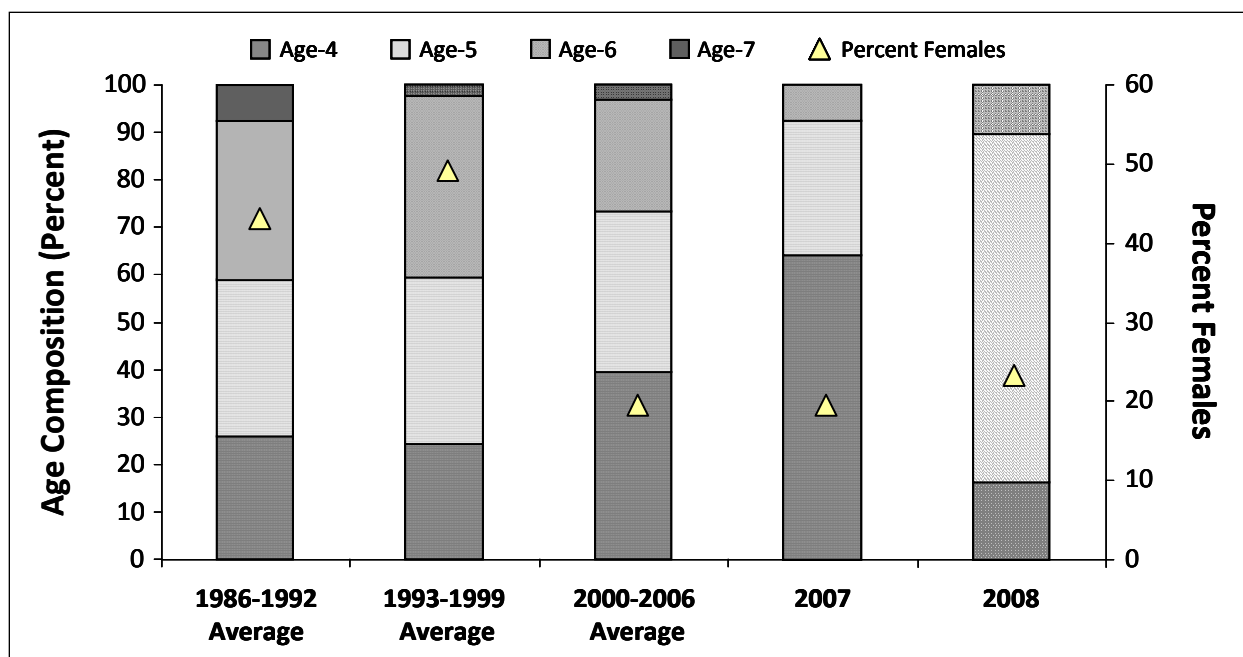


Figure 14.—The 2007 and 2008 Chinook salmon age and sex compositions compared with the 1986–1992, 1993–1999, and 2000–2006 average age and sex compositions of Unalakleet River test fishery (5/8-inch mesh) samples.

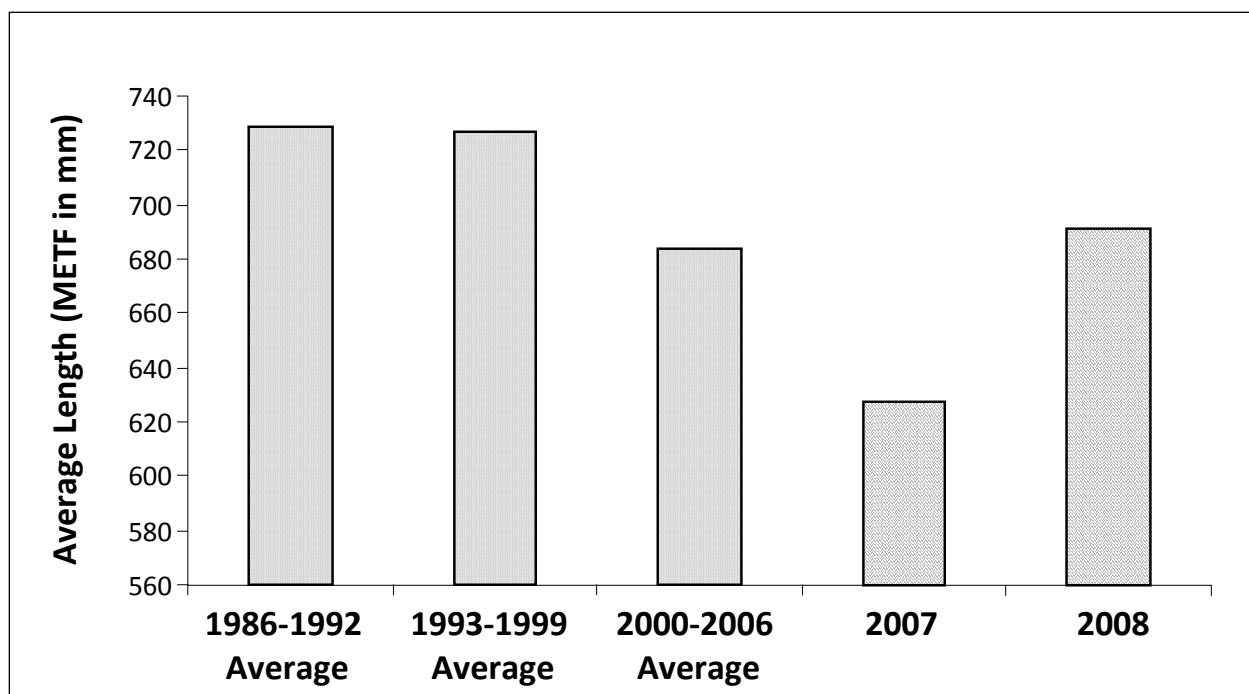


Figure 15.—Comparison of the 2007–2008 Chinook salmon average lengths with 1986–1992, 1993–1999, and 2000–2006 average lengths, Unalakleet River test fishery (5/8-inch mesh) samples, 1986–2008.

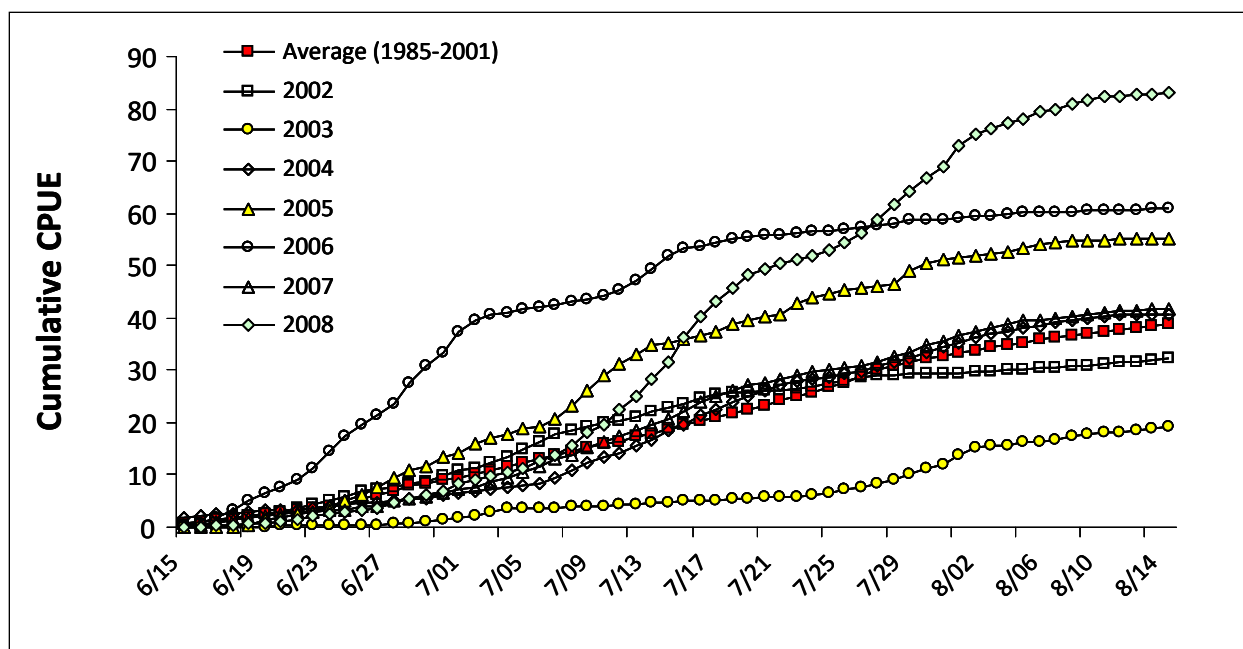


Figure 16.—Chum salmon cumulative test fishing catch per unit effort (CPUE) by date compared to the historical average, Unalakleet River test net, Norton Sound, 2002–2008.

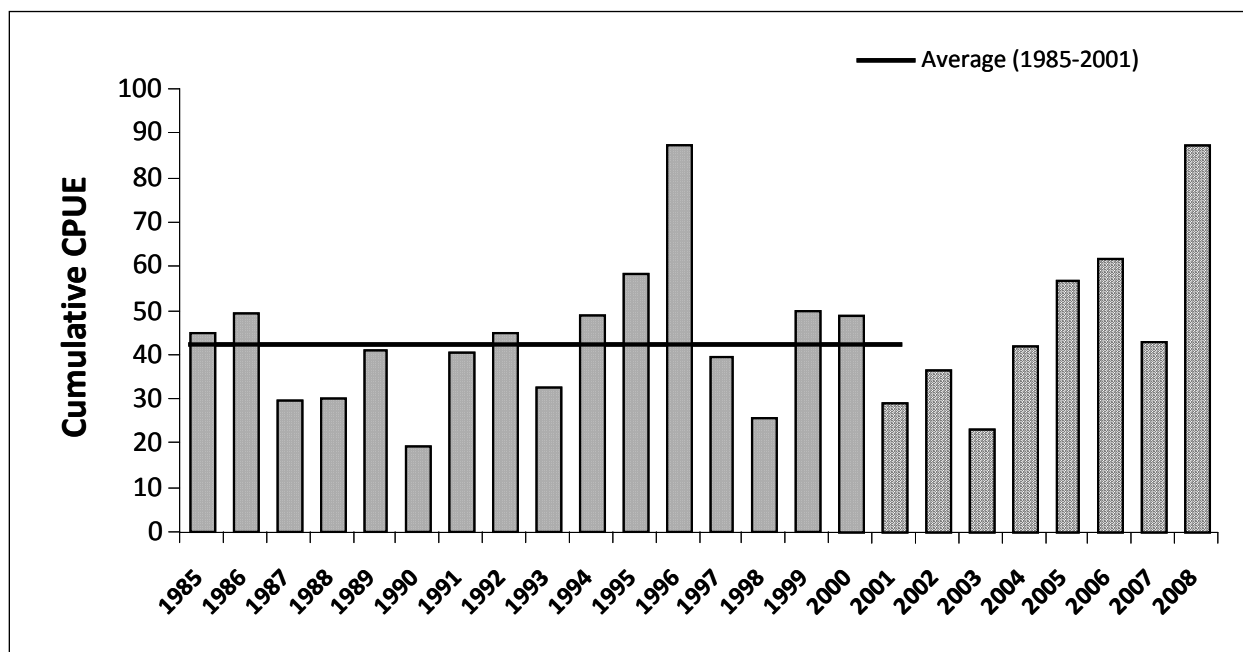


Figure 17.—Annual chum salmon cumulative test fishing catch per unit effort (CPUE) compared to the historical average, Unalakleet River test net, Norton Sound, 1985–2008.

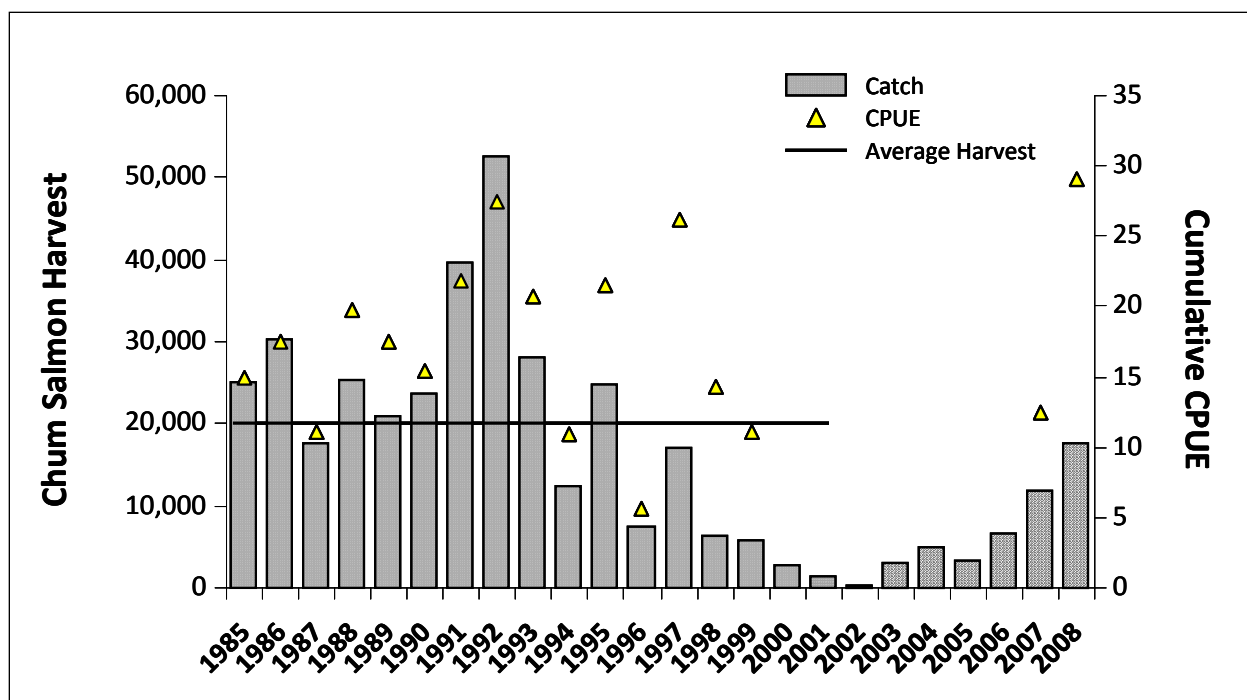


Figure 18.—Annual commercial chum salmon cumulative catch and catch per unit effort (CPUE) compared to the historical average, Unalakleet Subdistrict, Norton Sound, 1985–2008.

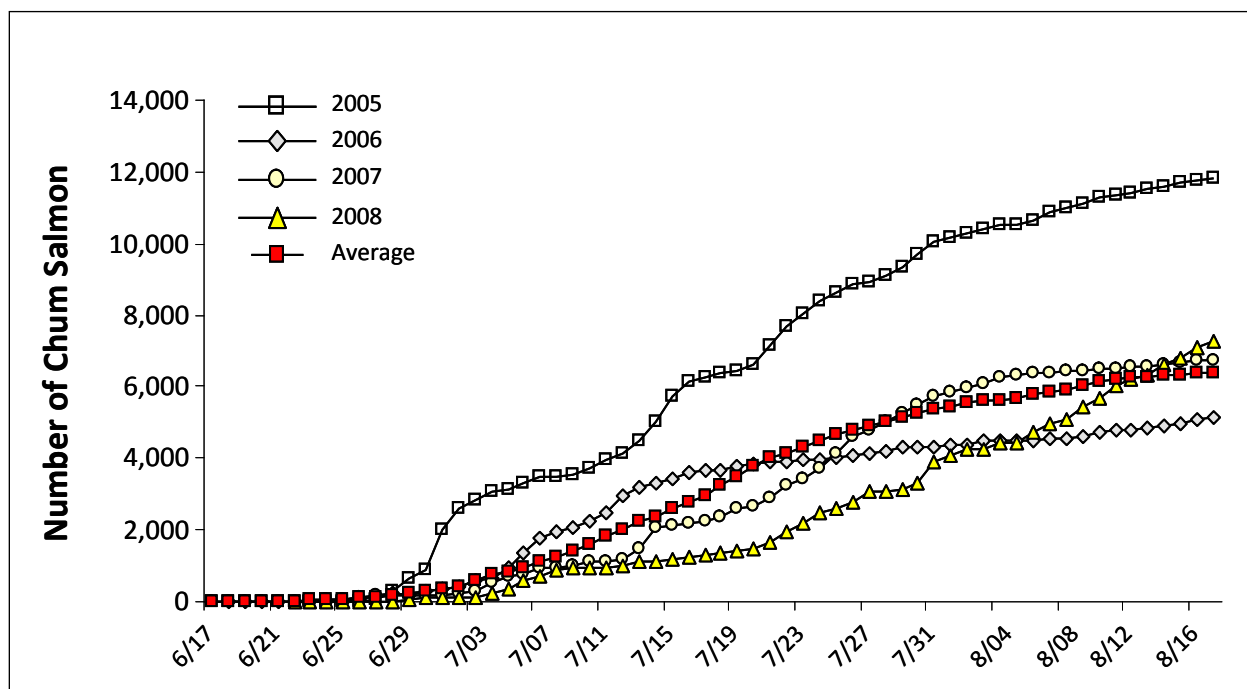


Figure 19.—Estimated cumulative chum salmon passage by date compared to the historical average (1996–2004), North River counting tower, North River, Unalakleet River drainage, Norton Sound, 2005–2008.

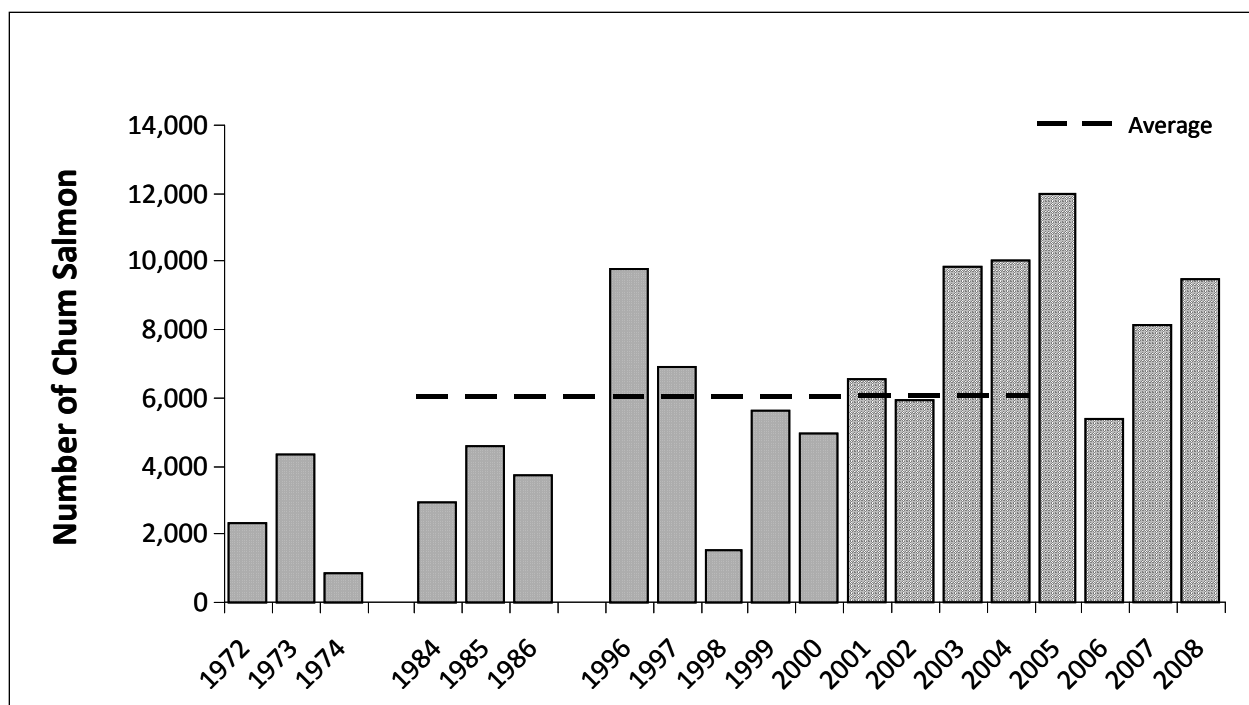
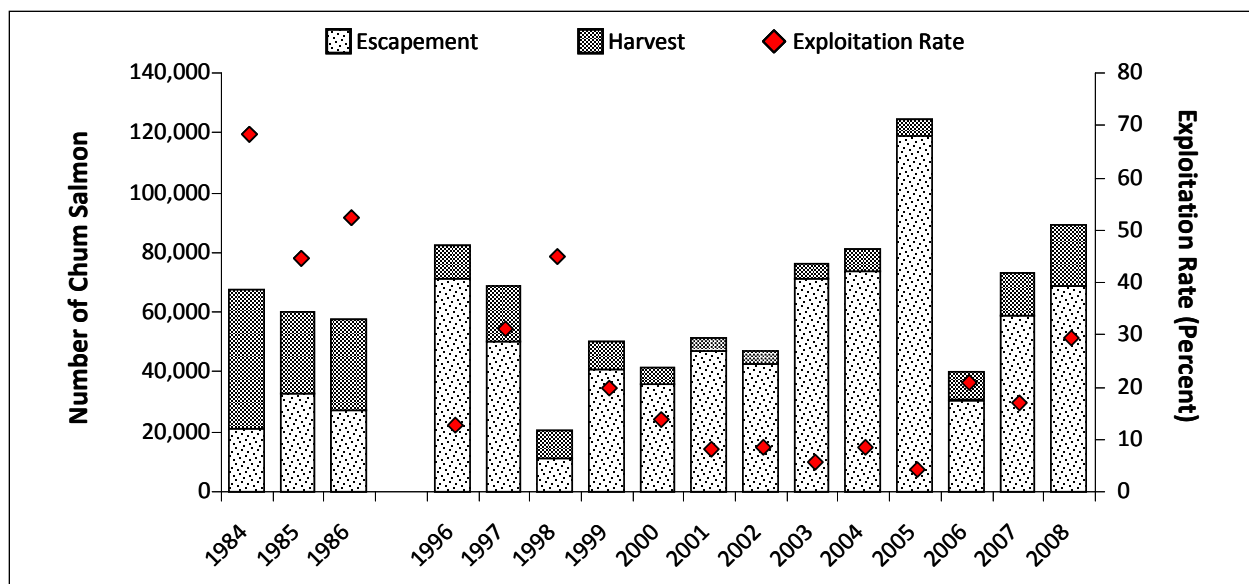


Figure 20.—Annual estimated chum salmon passage compared to the historical average (1984–1986, and 1996–2004) at the North River counting tower, Unalakleet River drainage, Norton Sound, 1972–1974, 1984–1986, and 1996–2008.



Note: Drainagewide escapement estimates for the 2004–2006 seasons calculated by expanding tower counts by North River proportional abundance estimates (0.136, 0.101, and 0.177, respectively). Drainagewide escapements estimated for all other years by expanding tower counts by the 2004–2006 average proportion (0.138) of chum salmon migrating into the North River (Estensen and Balland *In prep*).

Figure 21.—Estimated escapement, total harvest, and total run compared to exploitation rate, Unalakleet River chum salmon, 1984–1986 and 1996–2008.

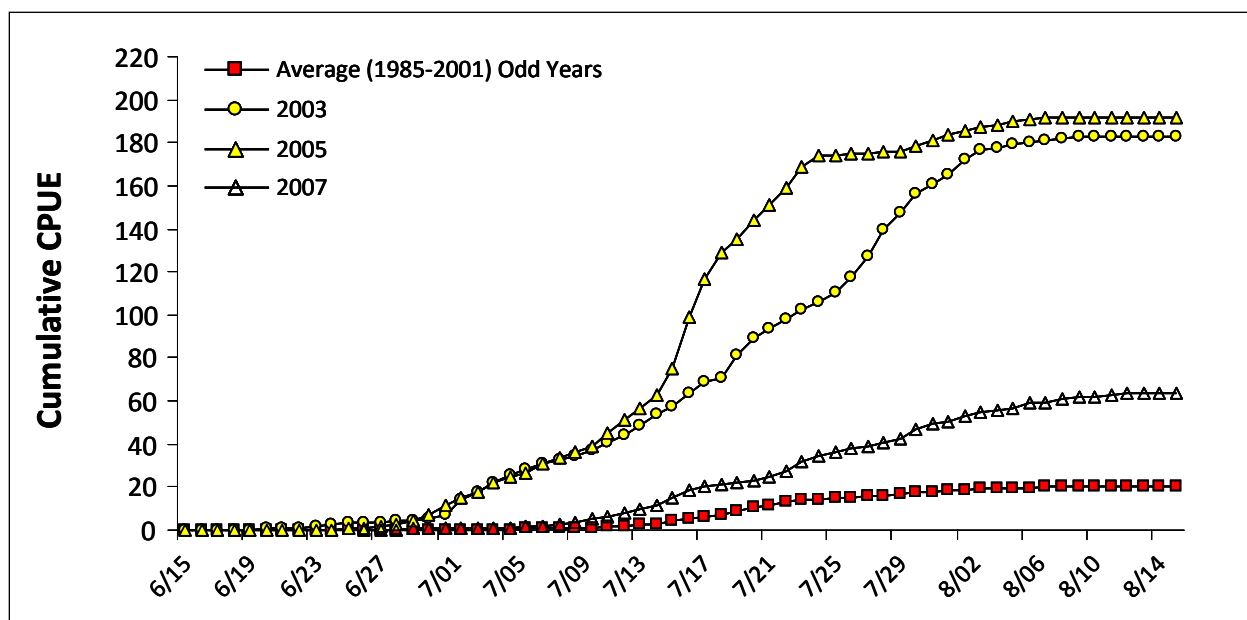


Figure 22.—Pink salmon cumulative test fishing catch per unit effort (CPUE) by date compared to the odd-numbered year average, Unalakleet River test net, Norton Sound, 2003, 2005, and 2007 seasons.

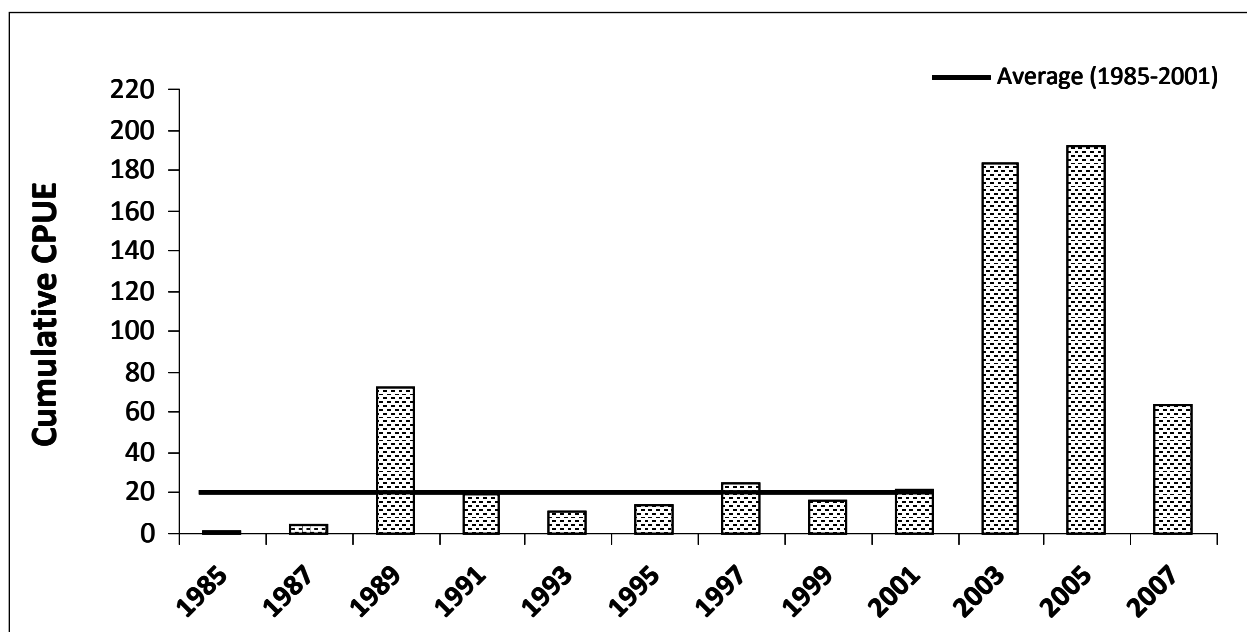


Figure 23.—Annual odd-numbered year pink salmon test fishing cumulative catch per unit effort (CPUE) compared to the historical odd-numbered year average, 1985–2001, Unalakleet River test net, Norton Sound.

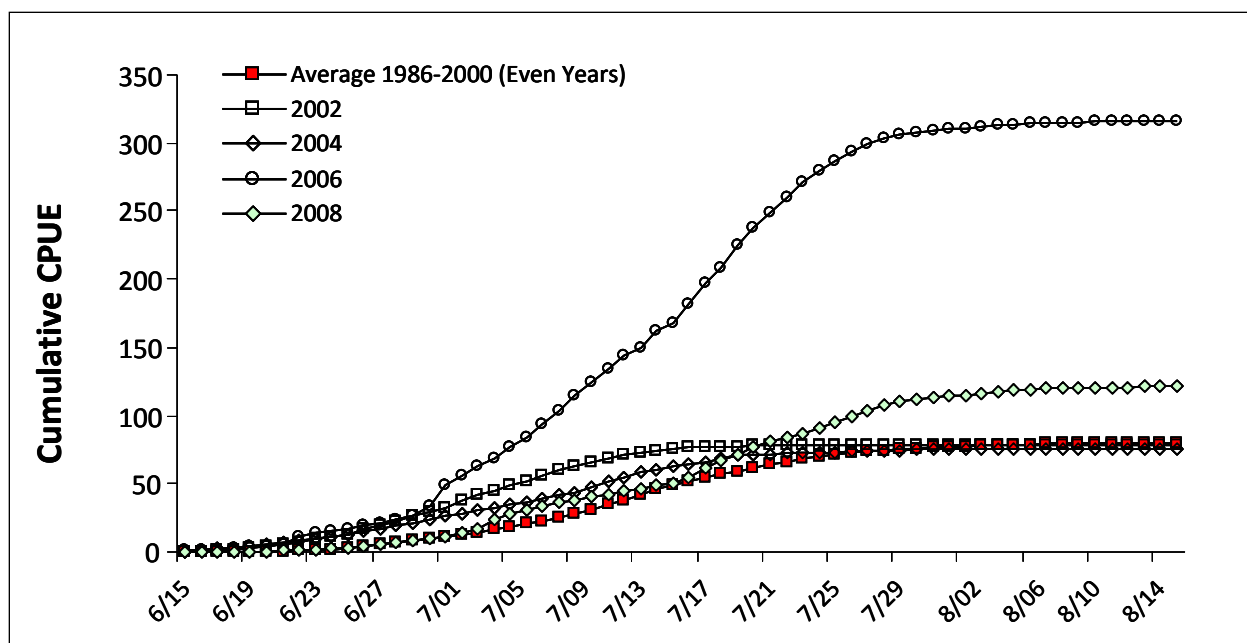


Figure 24.—Pink salmon cumulative test fishing catch per unit effort (CPUE) by date compared to the even-numbered year historical average, Unalakleet River test net, Norton Sound, 2002, 2004, 2006, and 2008 seasons.

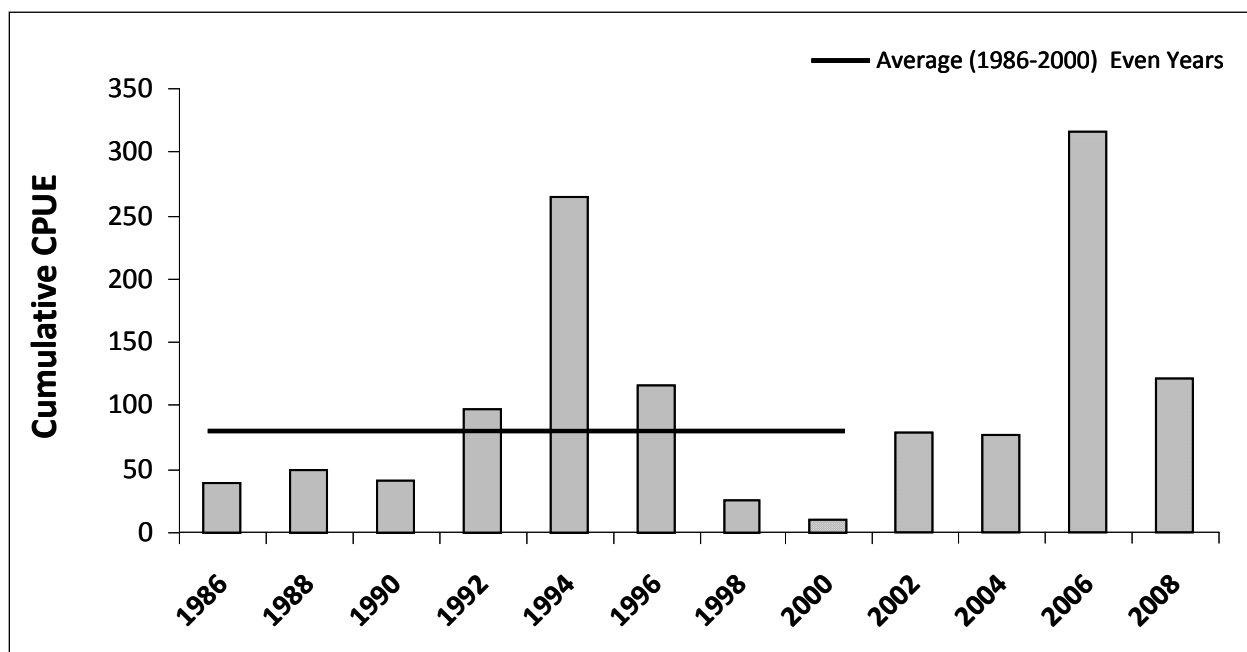


Figure 25.—Annual even-numbered year pink salmon test fishing cumulative catch per unit effort (CPUE) compared to the even-numbered year historical average, 1986–2000, Unalakleet River test net, Norton Sound.



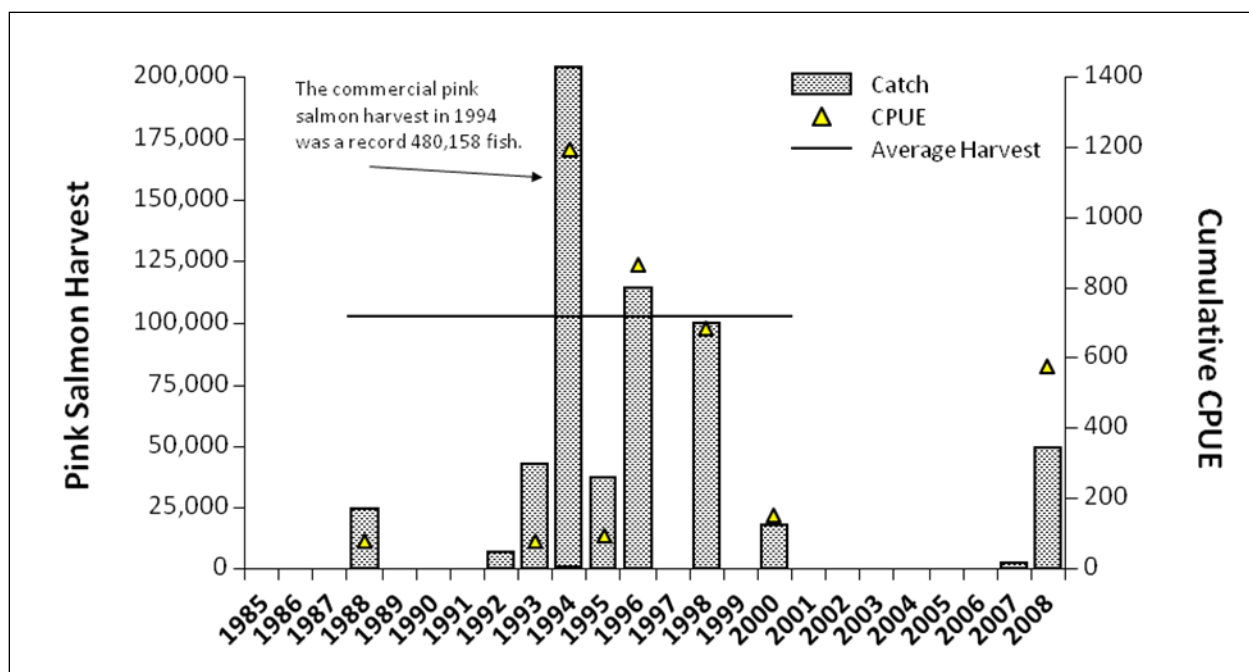


Figure 26.—Annual commercial pink salmon cumulative catch and catch per unit effort (CPUE) compared to the historical average, Unalakleet Subdistrict, Norton Sound, 1985–2008.

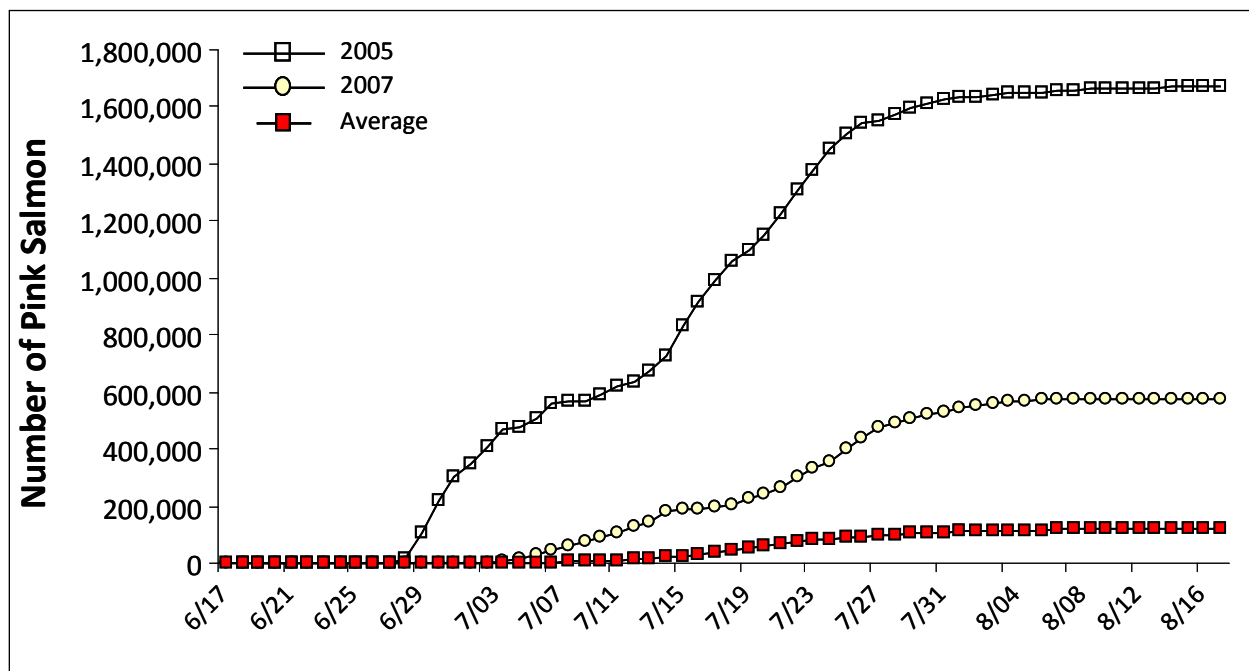


Figure 27.—Estimated cumulative pink salmon passage by date compared to the historical odd-numbered year average (1997–2003), North River counting tower, North River, Unalakleet River drainage, Norton Sound, 2005 and 2007 seasons.

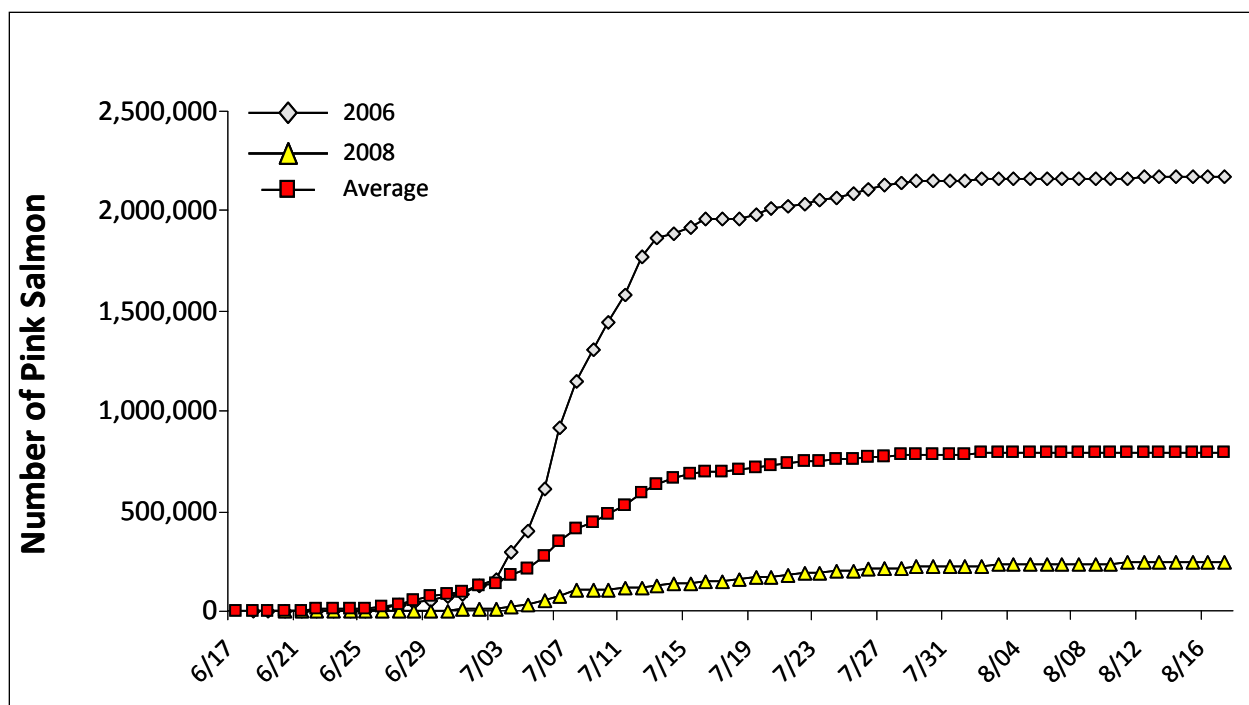


Figure 28.—Estimated cumulative pink salmon passage by date compared to the historical even-numbered year average (1996–2004), North River counting tower, Unalakleet River drainage, Norton Sound, 2006 and 2008 seasons.

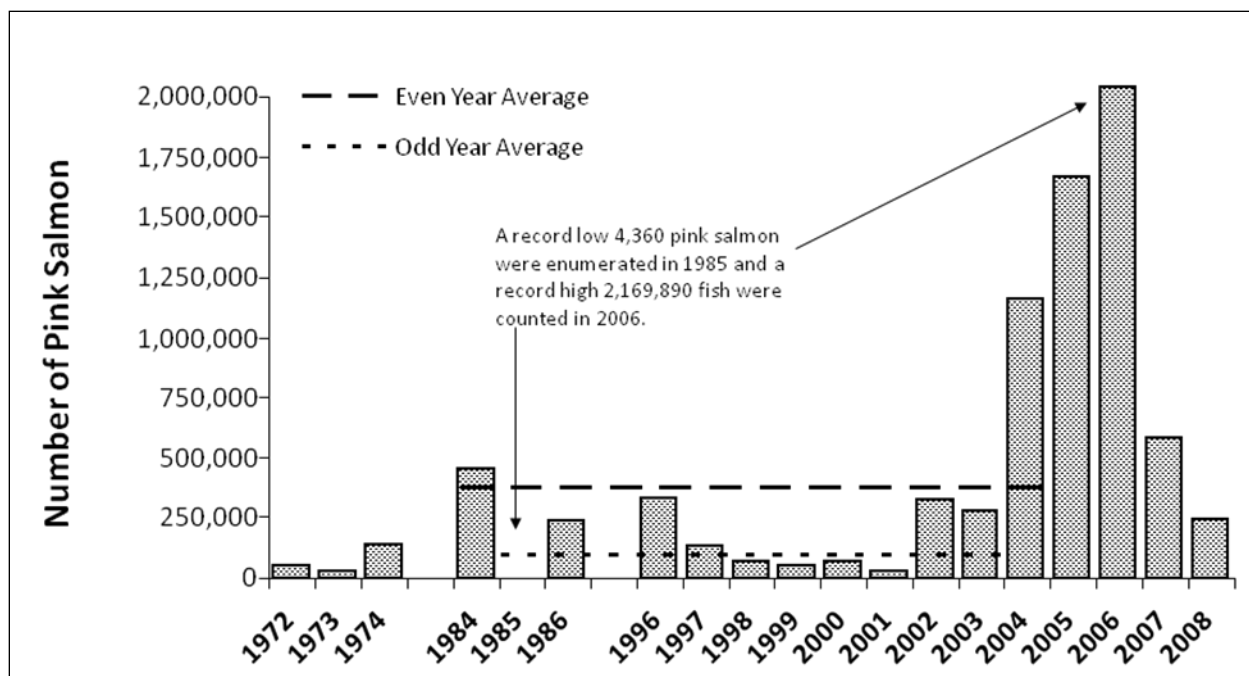


Figure 29.—Estimated annual pink salmon passage compared to the odd (1985–2003) and even-numbered (1984–2004) year historical averages at the North River counting tower, Unalakleet River drainage, Norton Sound, 1972–1974, 1984–1986, and 1996–2008.

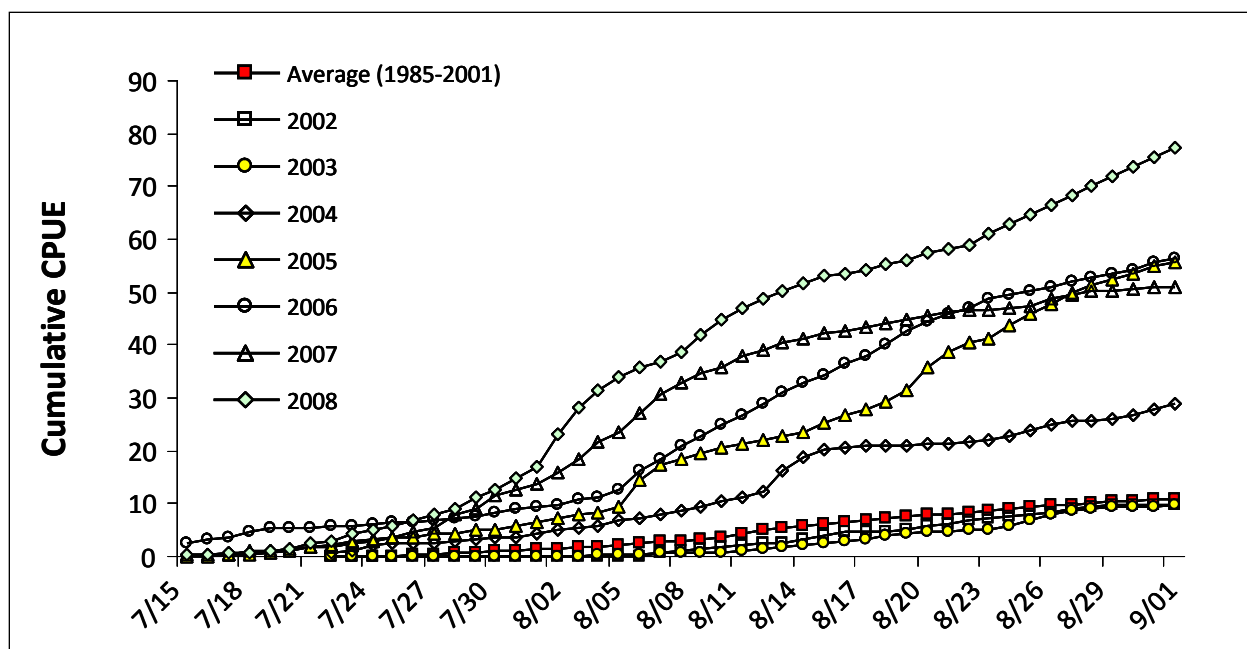


Figure 30.—Coho salmon cumulative test fishing catch per unit effort (CPUE) by date compared to the historical average, Unalakleet River test net, Norton Sound, 2002–2008.

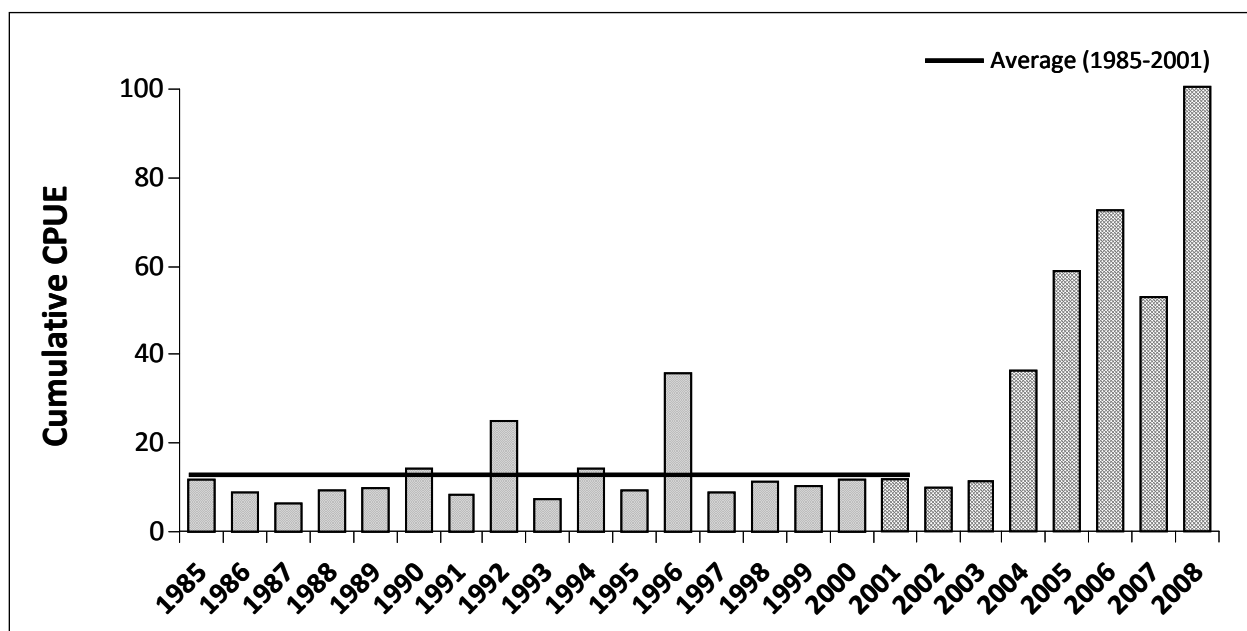


Figure 31.—Annual coho salmon cumulative test fishing catch per unit effort (CPUE) compared to the historical average, Unalakleet River test net, Norton Sound, 1985–2008.

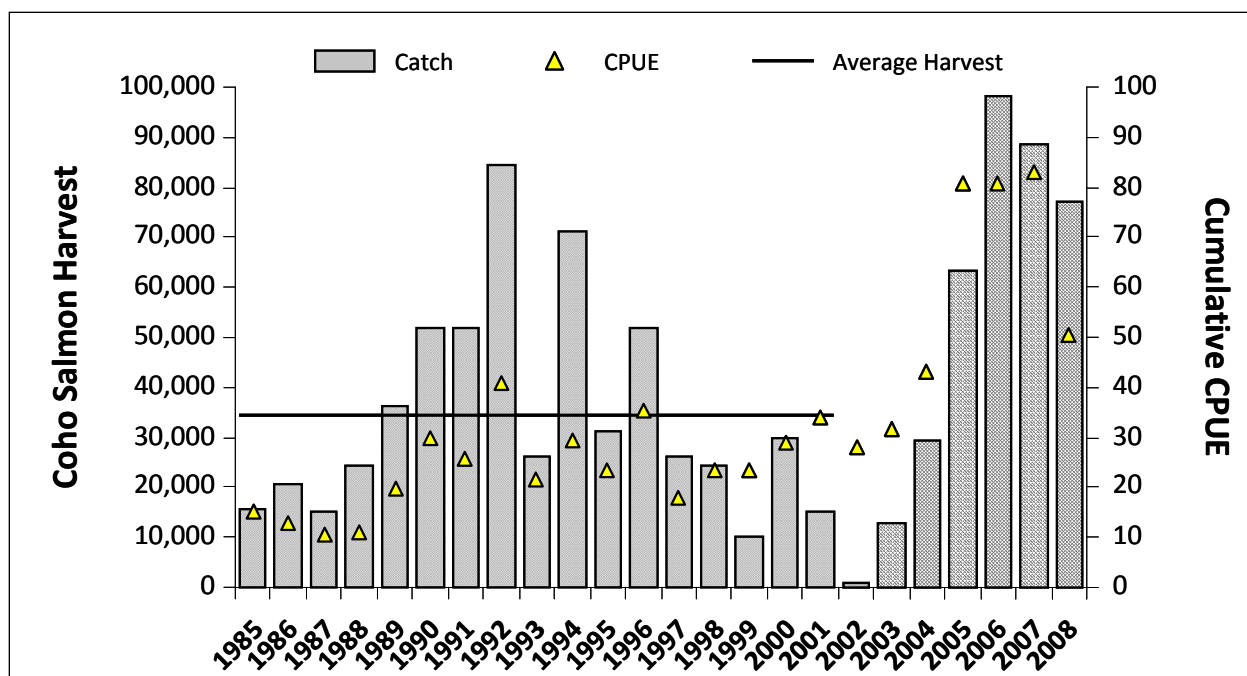


Figure 32.—Annual commercial coho salmon cumulative catch and catch per unit effort (CPUE) compared to the historical average, Unalakleet Subdistrict, Norton Sound, 1985–2008.

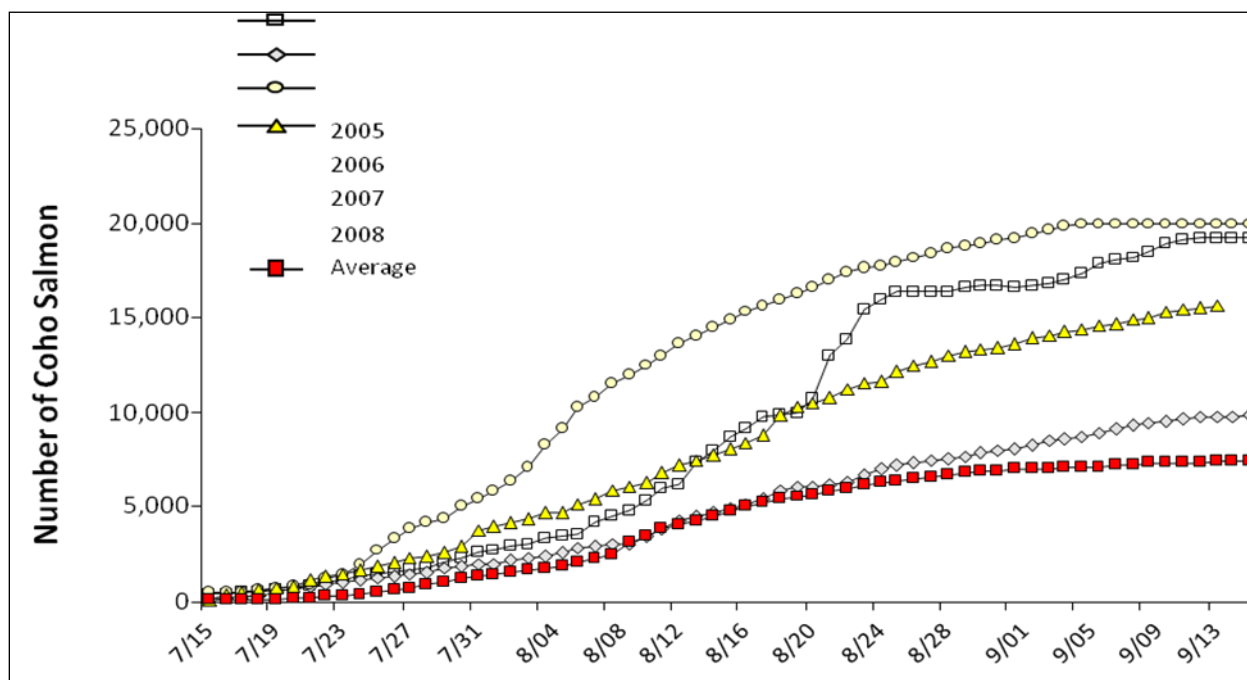


Figure 33.—Estimated cumulative coho salmon passage by date compared to the historical average (1999, and 2001–2004), North River counting tower, Unalakleet River drainage, Norton Sound, 2005–2008.

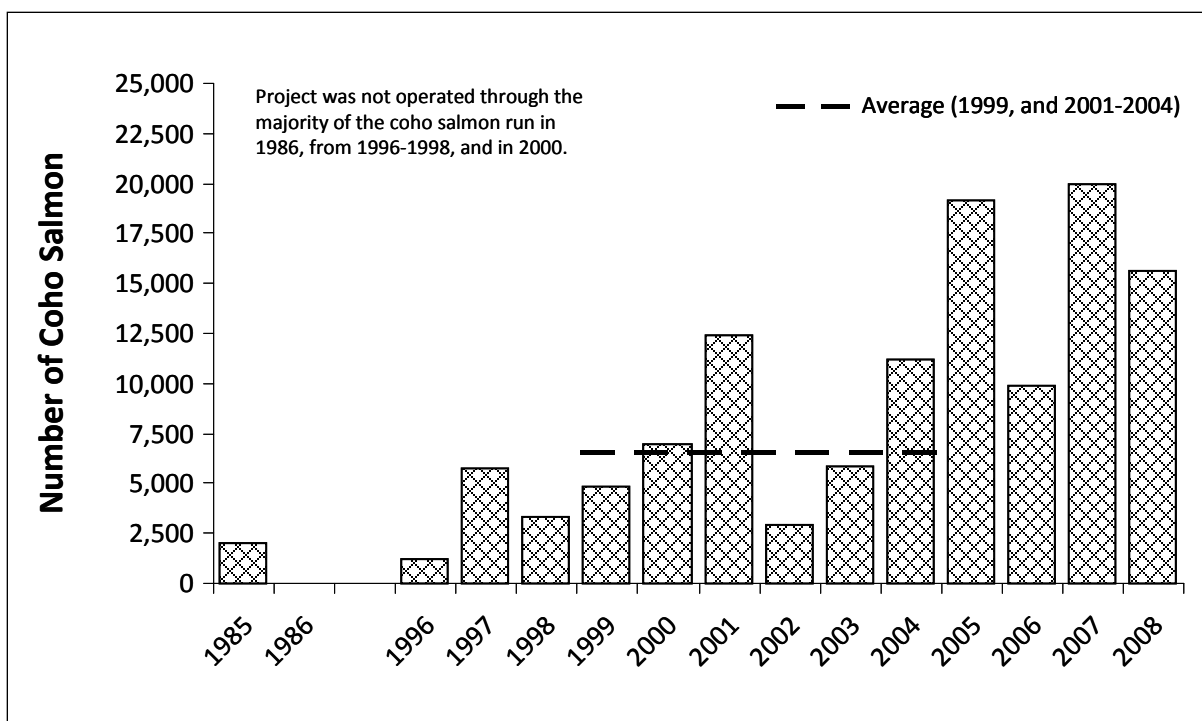
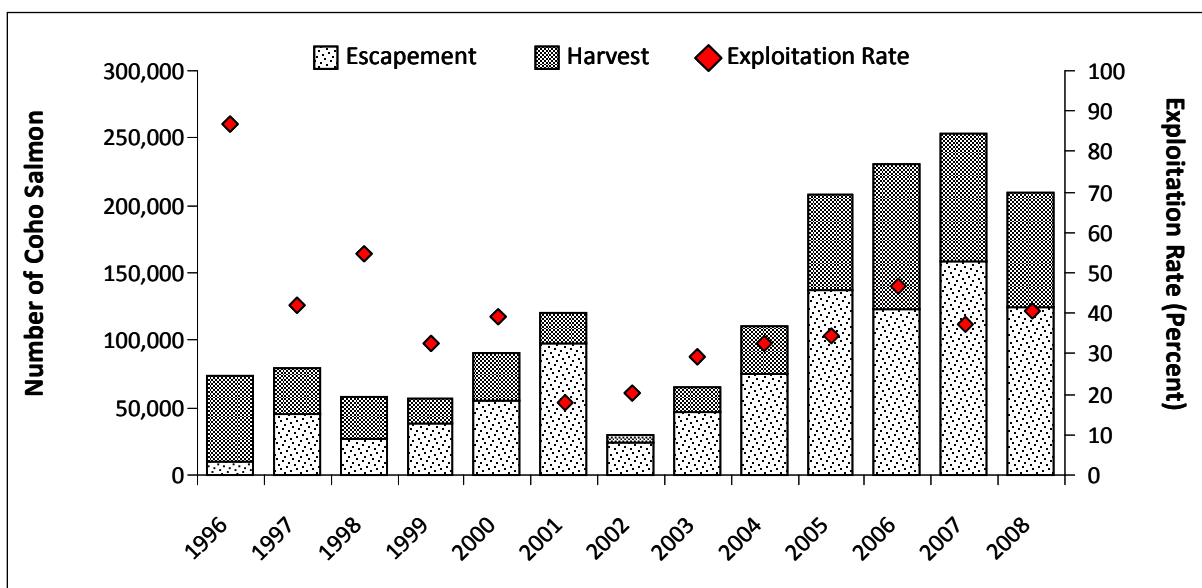


Figure 34.—Estimated annual coho salmon passage compared to the historical average (1985, 1999, and 2001–2004) at the North River counting tower, Unalakleet River drainage, Norton Sound, 1985 and 1996–2008.



Note: Drainagewide escapement estimates for 2004–2006 seasons were calculated by expanding tower counts by North River proportional abundance estimates (0.152, 0.143, and 0.082 respectively) determined by radiotelemetry. Drainagewide escapement estimates for all other years calculated by expanding tower counts by North River 2004–2006 average proportional abundance estimate of 0.126 (Joy and Reed 2007). Majority of coho salmon run not counted in 1996, 1998, and 2000.

Figure 35.—Estimated escapement, total harvest, and total run compared to exploitation rate, Unalakleet River coho salmon, 1996–2008.



## APPENDIX A: CATCH AND ESCAPEMENT

Appendix A1.–Expanded daily and cumulative (Cum.) migration of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2002.

Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon
03 Jun	0	0	0	0	0	0	0	0
04 Jun	0	0	0	0	0	0	0	0
05 Jun	0	0	0	0	0	0	0	0
06 Jun	0	0	0	0	0	0	0	0
07 Jun	0	0	0	0	0	0	0	0
08 Jun	0	0	0	0	1	1	0	0
09 Jun	0	0	0	0	1	2	0	0
10 Jun	0	0	0	0	0	2	0	0
11 Jun	0	0	0	0	0	2	0	0
12 Jun	0	0	0	0	0	2	0	0
13 Jun	4	4	0	0	0	2	0	0
14 Jun	11	15	0	0	0	2	0	0
15 Jun	4	19	0	0	0	2	0	0
16 Jun	3	22	5	5	0	2	0	0
17 Jun	9	31	15	20	1	3	0	0
18 Jun	10	41	20	40	0	3	0	0
19 Jun	15	56	26	66	0	3	0	0
20 Jun	11	67	30	96	2	5	0	0
21 Jun	16	83	30	126	2	7	0	0
22 Jun	12	95	42	168	3	10	0	0
23 Jun	18	113	53	221	2	12	0	0
24 Jun	22	135	35	256	3	15	0	0
25 Jun	15	150	47	303	4	19	0	0
26 Jun	25	175	84	387	5	24	0	0
27 Jun	11	186	75	462	7	31	0	0
28 Jun	9	195	87	549	1	32	0	0
29 Jun	15	210	75	624	1	33	0	0
30 Jun	13	223	71	695	0	33	0	0
01 Jul	22	245	77	772	1	34	0	0
02 Jul	22	267	135	907	1	35	0	0
03 Jul	17	284	107	1,014	1	36	0	0
04 Jul	23	307	76	1,090	0	36	0	0
05 Jul	28	335	77	1,167	1	37	0	0
06 Jul	29	364	85	1,252	3	40	0	0
07 Jul	37	401	76	1,328	0	40	0	0
08 Jul	32	433	109	1,437	1	41	0	0
09 Jul	21	454	63	1,500	1	42	0	0
10 Jul	19	473	85	1,585	0	42	0	0

-continued-



Appendix A1.–Page 2 of 3.

Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon
11 Jul	15	488	74	1,659	0	42	0	0
12 Jul	14	502	69	1,728	0	42	0	0
13 Jul	17	519	32	1,760	2	44	0	0
14 Jul	24	543	23	1,783	0	44	0	0
15 Jul	15	558	29	1,812	0	44	0	0
16 Jul	20	578	24	1,836	0	44	0	0
17 Jul	23	601	12	1,848	0	44	0	0
18 Jul	18	619	4	1,852	0	44	0	0
19 Jul	8	627	4	1,856	0	44	0	0
20 Jul	1	628	3	1,859	0	44	0	0
21 Jul	3	631	3	1,862	0	44	0	0
22 Jul	5	636	3	1,865	0	44	0	0
23 Jul	6	642	0	1,865	0	44	0	0
24 Jul	12	654	0	1,865	0	44	0	0
25 Jul	19	673	2	1,867	0	44	0	0
26 Jul	7	680	2	1,869	0	44	0	0
27 Jul	5	685	0	1,869	0	44	0	0
28 Jul	4	689	0	1,869	0	44	0	0
29 Jul	2	691	0	1,869	0	44	0	0
30 Jul	4	695	0	1,869	0	44	0	0
31 Jul	3	698	0	1,869	0	44	0	0
01 Aug	2	700	1	1,870	0	44	0	0
02 Aug	2	702	0	1,870	0	44	0	0
03 Aug	1	703	0	1,870	0	44	0	0
04 Aug	3	706	0	1,870	0	44	0	0
05 Aug	5	711	0	1,870	0	44	8	8
06 Aug	5	716	0	1,870	0	44	4	12
07 Aug	2	718	0	1,870	0	44	12	24
08 Aug	6	724	0	1,870	0	44	12	36
09 Aug	4	728	1	1,871	0	44	12	48
10 Aug	1	729	0	1,871	0	44	5	53
11 Aug	4	733	0	1,871	0	44	7	60
12 Aug	7	740	0	1,871	0	44	8	68
13 Aug	8	748	0	1,871	0	44	6	74
14 Aug	6	754	1	1,872	0	44	11	85
15 Aug	7	761	0	1,872	0	44	20	105
16 Aug	5	766	1	1,873	0	44	16	121
17 Aug	1	767	0	1,873	0	44	1	122
18 Aug	5	772	1	1,874	0	44	4	126
19 Aug	9	781	1	1,875	0	44	7	133

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon
20 Aug	6	787	1	1,876	0	44	13	146
21 Aug	5	792	2	1,878	0	44	13	159
22 Aug	5	797	0	1,878	0	44	15	174
23 Aug	4	801	2	1,880	0	44	9	183
24 Aug	1	802	0	1,880	0	44	7	190
25 Aug	2	803	0	1,880	0	44	10	<b>199</b>
26 Aug	2	805	0	1,880	0	44	12	211
27 Aug	5	810	0	1,880	0	44	16	227
28 Aug	6	816	1	1,881	0	44	8	235
29 Aug	1	817	1	1,882	0	44	7	242
30 Aug	1	818	0	1,882	0	44	6	248
31 Aug	4	822	1	1,883	0	44	10	258
01 Sep	6	828	1	1,884	0	44	10	267
02 Sep	7	835	2	1,886	0	44	13	280
03 Sep	4	839	0	1,886	0	44	15	295
04 Sep	2	841	0	1,886	0	44	22	317
05 Sep	3	844	0	1,886	0	44	37	354
06 Sep	2	846	0	1,886	0	44	14	368
07 Sep	2	848	0	1,886	0	44	16	384
08 Sep	4	852	0	1,886	0	44	10	394
09 Sep	0	852	0	1,886	0	44	0	394
10 Sep	0	852	0	1,886	0	44	0	394
11 Sep	0	852	0	1,886	0	44	0	394
Total	852		1,886		44		394	

*Note:* The box within the column indicates the first to third quartiles of the cumulative test fishery catch whereas the midpoint of the test fishery catch is indicated by the box with bold text.

Appendix A2.–Daily and cumulative (Cum.) CPUE of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2002.

Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
03 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08 Jun	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00
09 Jun	0.00	0.00	0.00	0.00	0.04	0.08	0.00	0.00
10 Jun	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
11 Jun	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
12 Jun	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
13 Jun	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
14 Jun	0.21	0.21	0.00	0.00	0.00	0.08	0.00	0.00
15 Jun	0.17	0.38	0.00	0.00	0.00	0.08	0.00	0.00
16 Jun	0.13	0.50	0.00	0.00	0.00	0.08	0.00	0.00
17 Jun	0.38	0.88	0.42	0.42	0.04	0.13	0.00	0.00
18 Jun	0.42	1.29	0.83	1.25	0.00	0.13	0.00	0.00
19 Jun	0.63	1.92	1.08	2.33	0.00	0.13	0.00	0.00
20 Jun	0.46	2.38	1.25	3.58	0.08	0.21	0.00	0.00
21 Jun	0.67	3.04	1.25	4.83	0.08	0.29	0.00	0.00
22 Jun	0.50	3.54	1.75	6.58	0.13	0.42	0.00	0.00
23 Jun	0.75	4.29	2.21	8.79	0.08	0.50	0.00	0.00
24 Jun	0.92	5.21	1.46	10.25	0.13	0.63	0.00	0.00
25 Jun	0.63	5.83	1.96	12.21	0.17	0.79	0.00	0.00
26 Jun	1.04	6.88	3.50	15.71	0.21	1.00	0.00	0.00
27 Jun	0.46	7.33	3.13	18.83	0.29	1.29	0.00	0.00
28 Jun	0.38	7.71	3.63	22.46	0.04	1.33	0.00	0.00
29 Jun	0.63	8.33	3.13	25.58	0.04	1.38	0.00	0.00
30 Jun	0.54	8.88	2.96	28.54	0.00	1.38	0.00	0.00
01 Jul	0.92	9.79	3.21	31.75	0.04	1.42	0.00	0.00
02 Jul	0.92	10.71	5.63	37.38	0.04	1.46	0.00	0.00
03 Jul	0.71	11.42	4.46	41.83	0.04	1.50	0.00	0.00
04 Jul	0.96	12.38	3.17	45.00	0.00	1.50	0.00	0.00
05 Jul	1.17	13.54	3.21	48.21	0.04	1.54	0.00	0.00
06 Jul	1.21	14.75	3.54	51.75	0.13	1.67	0.00	0.00
07 Jul	1.54	16.29	3.17	54.92	0.00	1.67	0.00	0.00
08 Jul	1.33	17.63	4.54	59.46	0.04	1.71	0.00	0.00
09 Jul	0.88	18.50	2.63	62.08	0.04	1.75	0.00	0.00
10 Jul	0.79	19.29	3.54	65.63	0.00	1.75	0.00	0.00
11 Jul	0.63	19.92	3.08	68.71	0.00	1.75	0.00	0.00
12 Jul	0.58	20.50	2.88	71.58	0.00	1.75	0.00	0.00
13 Jul	0.71	21.21	1.33	72.92	0.08	1.83	0.00	0.00
14 Jul	1.00	22.21	0.96	73.88	0.00	1.83	0.00	0.00

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Date	Chum Salmon	Chum Salmon	Pink Salmon	Pink Salmon	Chinook Salmon	Chinook Salmon	Coho Salmon	Coho Salmon
	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE
15 Jul	0.63	22.83	1.21	75.08	0.00	1.83	0.00	0.00
16 Jul	0.83	23.67	1.00	76.08	0.00	1.83	0.00	0.00
17 Jul	0.96	24.63	0.50	76.58	0.00	1.83	0.00	0.00
18 Jul	0.75	25.38	0.17	76.75	0.00	1.83	0.00	0.00
19 Jul	0.33	25.71	0.17	76.92	0.00	1.83	0.00	0.00
20 Jul	0.13	25.83	0.38	77.29	0.00	1.83	0.00	0.00
21 Jul	0.17	26.00	0.25	77.54	0.00	1.83	0.00	0.00
22 Jul	0.21	26.21	0.13	77.67	0.00	1.83	0.00	0.00
23 Jul	0.25	26.46	0.00	77.67	0.00	1.83	0.00	0.00
24 Jul	0.50	26.96	0.00	77.67	0.00	1.83	0.00	0.00
25 Jul	0.79	27.75	0.08	77.75	0.00	1.83	0.00	0.00
26 Jul	0.29	28.04	0.08	77.83	0.00	1.83	0.00	0.00
27 Jul	0.63	28.67	0.00	77.83	0.00	1.83	0.00	0.00
28 Jul	0.35	29.02	0.00	77.83	0.00	1.83	0.00	0.00
29 Jul	0.08	29.10	0.00	77.83	0.00	1.83	0.00	0.00
30 Jul	0.17	29.27	0.00	77.83	0.00	1.83	0.00	0.00
31 Jul	0.13	29.40	0.00	77.83	0.00	1.83	0.00	0.00
01 Aug	0.08	29.48	0.04	77.88	0.00	1.83	0.00	0.00
02 Aug	0.08	29.56	0.00	77.88	0.00	1.83	0.00	0.00
03 Aug	0.13	29.69	0.00	77.88	0.00	1.83	0.00	0.00
04 Aug	0.17	29.85	0.00	77.88	0.00	1.83	0.00	0.00
05 Aug	0.21	30.06	0.00	77.88	0.00	1.83	0.00	0.00
06 Aug	0.21	30.27	0.00	77.88	0.00	1.83	0.08	0.08
07 Aug	0.08	30.35	0.00	77.88	0.00	1.83	0.50	0.58
08 Aug	0.25	30.60	0.00	77.88	0.00	1.83	0.50	1.08
09 Aug	0.17	30.77	0.04	77.92	0.00	1.83	0.50	1.58
10 Aug	0.13	30.90	0.00	77.92	0.00	1.83	0.21	1.79
11 Aug	0.21	31.10	0.00	77.92	0.00	1.83	0.27	2.06
12 Aug	0.29	31.40	0.00	77.92	0.00	1.83	0.33	2.40
13 Aug	0.33	31.73	0.00	77.92	0.00	1.83	0.25	2.65
14 Aug	0.25	31.98	0.04	77.96	0.00	1.83	0.46	3.10
15 Aug	0.29	32.27	0.00	77.96	0.00	1.83	0.83	3.94
16 Aug	0.21	32.48	0.04	78.00	0.00	1.83	0.67	4.60
17 Aug	0.13	32.60	0.00	78.00	0.00	1.83	0.04	4.65
18 Aug	0.25	32.85	0.02	78.02	0.00	1.83	0.17	4.81
19 Aug	0.38	33.23	0.04	78.06	0.00	1.83	0.29	5.10
20 Aug	0.25	33.48	0.04	78.10	0.00	1.83	0.54	5.65
21 Aug	0.21	33.69	0.08	78.19	0.00	1.83	0.54	6.19
22 Aug	0.21	33.90	0.00	78.19	0.00	1.83	0.63	6.81
23 Aug	0.17	34.06	0.08	78.27	0.00	1.83	0.38	7.19
24 Aug	0.13	34.19	0.00	78.27	0.00	1.83	0.29	7.48
25 Aug	0.10	34.29	0.00	78.27	0.00	1.83	0.40	7.88

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Date	Chum Salmon	Chum Salmon	Pink Salmon	Pink Salmon	Chinook Salmon	Chinook Salmon	Coho Salmon	Coho Salmon
	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE
26 Aug	0.08	34.38	0.00	78.27	0.00	1.83	0.50	8.38
27 Aug	0.21	34.58	0.00	78.27	0.00	1.83	0.67	9.04
28 Aug	0.25	34.83	0.04	78.31	0.00	1.83	0.33	9.38
29 Aug	0.04	34.88	0.04	78.35	0.00	1.83	0.29	9.67
30 Aug	0.13	35.00	0.00	78.35	0.00	1.83	0.25	9.92
31 Aug	0.18	35.18	0.03	78.39	0.00	1.83	0.00	9.92
01 Sep	0.24	35.42	0.01	78.39	0.00	1.83	0.00	9.92
02 Sep	0.29	35.71	0.08	78.48	0.00	1.83	0.54	10.46
03 Sep	0.17	35.88	0.00	78.48	0.00	1.83	0.63	11.08
04 Sep	0.08	35.96	0.00	78.48	0.00	1.83	0.92	12.00
05 Sep	0.13	36.08	0.00	78.48	0.00	1.83	1.54	13.54
06 Sep	0.08	36.17	0.00	78.48	0.00	1.83	0.58	14.13
07 Sep	0.08	36.25	0.00	78.48	0.00	1.83	0.67	14.79
08 Sep	0.17	36.42	0.00	78.48	0.00	1.83	0.42	15.21
09 Sep	0.00	36.42	0.00	78.48	0.00	1.83	0.00	15.21
10 Sep	0.00	36.42	0.00	78.48	0.00	1.83	0.00	15.21
11 Sep	0.00	36.42	0.00	78.48	0.00	1.83	0.00	15.21
Total	36.42		78.48		1.83		15.21	

Appendix A3.–Expanded daily and cumulative (Cum.) migration of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2003.

Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon
02 Jun		0		0	1	1	0	0
03 Jun		0		0	0	1	0	0
04 Jun		0		0	0	1	0	0
05 Jun		0		0	0	1	0	0
06 Jun		0		0	0	1	0	0
07 Jun	2	2		0	0	1	0	0
08 Jun	2	4		0	0	1	0	0
09 Jun	0	4		0	1	2	0	0
10 Jun	0	4		0	0	2	0	0
11 Jun	1	5		0	0	2	0	0
12 Jun	1	6		0	0	2	0	0
13 Jun	0	6		0	2	4	0	0
14 Jun	0	6		0	1	5	0	0
15 Jun	2	8	2	2	0	5	0	0
16 Jun	3	11	0	2	2	7	0	0
17 Jun	0	11	2	4	0	7	0	0
18 Jun	1	12	1	5	1	8	0	0
19 Jun	0	12	2	7	1	9	0	0
20 Jun	1	13	4	11	0	9	0	0
21 Jun	4	17	4	15	0	9	0	0
22 Jun	3	20	12	27	1	10	0	0
23 Jun	0	20	13	40	0	10	0	0
24 Jun	0	20	18	58	0	10	0	0
25 Jun	2	22	17	75	0	10	0	0
26 Jun	1	23	8	83	1	11	0	0
27 Jun	0	23	2	85	0	11	0	0
28 Jun	4	27	13	98	1	12	0	0
29 Jun	1	28	16	114	1	13	0	0
30 Jun	10	38	13	127	1	14	0	0
01 Jul	5	43	41	168	2	16	0	0
02 Jul	9	52	177	345	1	17	0	0
03 Jul	13	65	80	425	6	23	0	0
04 Jul	16	81	99	524	1	24	0	0
05 Jul	13	94	88	612	0	24	0	0
06 Jul	4	98	63	675	0	24	0	0
07 Jul	1	99	66	741	1	25	0	0
08 Jul	2	101	40	781	0	25	0	0
09 Jul	1	102	42	823	0	25	0	0

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon
10 Jul	3	105	74	897	0	25	0	0
11 Jul	1	106	73	970	0	25	0	0
12 Jul	5	111	81	1,051	0	25	0	0
13 Jul	3	114	115	1,166	0	25	0	0
14 Jul	6	120	124	1,290	0	25	0	0
15 Jul	6	126	90	1,380	0	25	0	0
16 Jul	3	129	143	1,523	0	25	0	0
17 Jul	5	134	121	1,644	0	25	0	0
18 Jul	0	134	51	1,695	0	25	0	0
19 Jul	2	136	85	1,780	0	25	0	0
20 Jul	2	138	99	1,879	0	25	0	0
21 Jul	2	140	113	1,992	0	25	0	0
22 Jul	4	144	115	2,107	0	25	0	0
23 Jul	2	146	99	2,206	0	25	0	0
24 Jul	4	150	78	2,284	0	25	0	0
25 Jul	10	160	106	2,390	0	25	0	0
26 Jul	5	165	57	2,447	0	25	0	0
27 Jul	8	173	177	2,624	0	25	0	0
28 Jul	12	185	297	2,921	0	25	0	0
29 Jul	19	204	202	3,123	0	25	0	0
30 Jul	26	230	202	3,325	0	25	2	2
31 Jul	27	257	110	3,435	0	25	1	3
01 Aug	21	278	98	3,533	0	25	5	8
02 Aug	15	293	58	3,591	0	25	1	9
03 Aug	12	305	45	3,636	0	25	3	12
04 Aug	9	314	31	3,667	0	25	4	16
05 Aug	8	322	31	3,698	0	25	1	17
06 Aug	10	332	27	3,725	0	25	2	19
07 Aug	2	334	23	3,748	0	25	2	21
08 Aug	12	346	13	3,761	0	25	2	23
09 Aug	5	351	7	3,768	0	25	0	23
10 Aug	5	356	5	3,773	0	25	4	27
11 Aug	5	361	3	3,776	0	25	8	35
12 Aug	6	367	1	3,777	0	25	6	41
13 Aug	7	374	0	3,777	0	25	9	50
14 Aug	7	381	1	3,778	0	25	5	55
15 Aug	6	387	0	3,778	0	25	15	70
16 Aug	4	391	2	3,780	0	25	5	75
17 Aug	9	400	1	3,781	0	25	10	85
18 Aug	13	413	0	3,781	0	25	15	100

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon
19 Aug	8	421	0	3,781	0	25	9	109
20 Aug	7	428	0	3,781	0	25	8	117
21 Aug	5	433	0	3,781	0	25	6	123
22 Aug	4	437	1	3,782	0	25	5	128
23 Aug	2	439	0	3,782	0	25	3	131
24 Aug	0	439	0	3,782	0	25	16	<b>147</b>
25 Aug	6	445	0	3,782	0	25	29	176
26 Aug	2	447	0	3,782	0	25	20	196
27 Aug	1	448	0	3,782	0	25	15	211
28 Aug	1	449	1	3,783	0	25	17	228
29 Aug	3	452	0	3,783	0	25	2	230
30 Aug	1	453	0	3,783	0	25	2	232
31 Aug	0	453	0	3,783	0	25	2	234
01 Sep	1	454	0	3,783	0	25	3	237
02 Sep	0	454	0	3,783	0	25	7	244
03 Sep	2	456	0	3,783	0	25	6	250
04 Sep	0	456	0	3,783	0	25	8	258
05 Sep	1	457	0	3,783	0	25	1	259
06 Sep	0	457	0	3,783	0	25	5	264
07 Sep	0	457	0	3,783	0	25	2	266
08 Sep	1	458	1	3,784	0	25	1	267
09 Sep	0	458	0	3,784	0	25	0	267
Total	458		3,784		25		267	

*Note:* The box within the column indicates the first to third quartiles of the cumulative test fishery catch whereas the midpoint of the test fishery catch is indicated by the box with bold text.



Appendix A4.–Daily and cumulative (Cum.) CPUE of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2003.

Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
02 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
09 Jun	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00
10 Jun	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
11 Jun	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
12 Jun	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
13 Jun	0.00	0.00	0.00	0.00	0.08	0.13	0.00	0.00
14 Jun	0.00	0.00	0.00	0.00	0.04	0.17	0.00	0.00
15 Jun	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00
16 Jun	0.04	0.04	0.00	0.00	0.08	0.25	0.00	0.00
17 Jun	0.00	0.04	0.00	0.00	0.00	0.25	0.00	0.00
18 Jun	0.04	0.08	0.00	0.00	0.04	0.29	0.00	0.00
19 Jun	0.00	0.08	0.04	0.04	0.04	0.33	0.00	0.00
20 Jun	0.04	0.13	0.17	0.21	0.00	0.33	0.00	0.00
21 Jun	0.17	0.29	0.17	0.38	0.00	0.33	0.00	0.00
22 Jun	0.13	0.42	0.50	0.88	0.04	0.38	0.00	0.00
23 Jun	0.00	0.42	0.54	1.42	0.00	0.38	0.00	0.00
24 Jun	0.00	0.42	0.75	2.17	0.00	0.38	0.00	0.00
25 Jun	0.08	0.50	0.71	2.88	0.00	0.38	0.00	0.00
26 Jun	0.04	0.54	0.33	3.21	0.04	0.42	0.00	0.00
27 Jun	0.00	0.54	0.08	3.29	0.00	0.42	0.00	0.00
28 Jun	0.17	0.71	0.54	3.83	0.04	0.46	0.00	0.00
29 Jun	0.04	0.75	0.67	4.50	0.04	0.50	0.00	0.00
30 Jun	0.42	1.17	0.54	5.04	0.04	0.54	0.00	0.00
01 Jul	0.21	1.38	1.71	6.75	0.08	0.63	0.00	0.00
02 Jul	0.38	1.75	7.38	14.13	0.04	0.67	0.00	0.00
03 Jul	0.54	2.29	3.33	17.46	0.25	0.92	0.00	0.00
04 Jul	0.67	2.96	4.13	21.58	0.04	0.96	0.00	0.00
05 Jul	0.54	3.50	3.67	25.25	0.00	0.96	0.00	0.00
06 Jul	0.17	3.67	2.63	27.88	0.00	0.96	0.00	0.00
07 Jul	0.04	3.71	2.75	30.63	0.04	1.00	0.00	0.00
08 Jul	0.08	3.79	1.67	32.29	0.00	1.00	0.00	0.00
09 Jul	0.04	3.83	1.75	34.04	0.00	1.00	0.00	0.00
10 Jul	0.13	3.96	3.08	37.13	0.00	1.00	0.00	0.00
11 Jul	0.04	4.00	3.04	40.17	0.00	1.00	0.00	0.00
12 Jul	0.21	4.21	3.38	43.54	0.00	1.00	0.00	0.00

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Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
13 Jul	0.13	4.33	4.79	48.33	0.00	1.00	0.00	0.00
14 Jul	0.25	4.58	5.17	53.50	0.00	1.00	0.00	0.00
15 Jul	0.25	4.83	3.75	57.25	0.00	1.00	0.00	0.00
16 Jul	0.13	4.96	5.96	63.21	0.00	1.00	0.00	0.00
17 Jul	0.21	5.17	5.04	68.25	0.00	1.00	0.00	0.00
18 Jul	0.00	5.17	2.13	70.38	0.00	1.00	0.00	0.00
19 Jul	0.25	5.42	10.63	81.00	0.00	1.00	0.00	0.00
20 Jul	0.17	5.58	7.67	88.67	0.00	1.00	0.00	0.00
21 Jul	0.08	5.67	4.71	93.38	0.00	1.00	0.00	0.00
22 Jul	0.17	5.83	4.79	98.17	0.00	1.00	0.00	0.00
23 Jul	0.08	5.92	4.13	102.29	0.00	1.00	0.00	0.00
24 Jul	0.17	6.08	3.25	105.54	0.00	1.00	0.00	0.00
25 Jul	0.42	6.50	4.42	109.96	0.00	1.00	0.00	0.00
26 Jul	0.63	7.13	7.13	117.08	0.00	1.00	0.00	0.00
27 Jul	0.56	7.69	9.75	126.83	0.00	1.00	0.00	0.00
28 Jul	0.50	8.19	12.38	139.21	0.00	1.00	0.00	0.00
29 Jul	0.79	8.98	8.42	147.63	0.00	1.00	0.00	0.00
30 Jul	1.08	10.06	8.42	156.04	0.00	1.00	0.00	0.00
31 Jul	1.13	11.19	4.58	160.63	0.00	1.00	0.00	0.00
01 Aug	0.88	12.06	4.08	164.71	0.00	1.00	0.00	0.00
02 Aug	1.88	13.94	7.25	171.96	0.00	1.00	0.00	0.00
03 Aug	1.13	15.06	4.27	176.23	0.00	1.00	0.13	0.13
04 Aug	0.38	15.44	1.29	177.52	0.00	1.00	0.25	0.38
05 Aug	0.33	15.77	1.29	178.81	0.00	1.00	0.04	0.42
06 Aug	0.42	16.19	1.13	179.94	0.00	1.00	0.08	0.50
07 Aug	0.08	16.27	0.96	180.90	0.00	1.00	0.08	0.58
08 Aug	0.50	16.77	0.54	181.44	0.00	1.00	0.08	0.67
09 Aug	0.63	17.40	0.88	182.31	0.00	1.00	0.00	0.67
10 Aug	0.42	17.81	0.50	182.81	0.00	1.00	0.17	0.83
11 Aug	0.21	18.02	0.13	182.94	0.00	1.00	0.33	1.17
12 Aug	0.25	18.27	0.04	182.98	0.00	1.00	0.25	1.42
13 Aug	0.29	18.56	0.00	182.98	0.00	1.00	0.38	1.79
14 Aug	0.29	18.85	0.04	183.02	0.00	1.00	0.21	2.00
15 Aug	0.25	19.10	0.00	183.02	0.00	1.00	0.63	2.63
16 Aug	0.50	19.60	0.25	183.27	0.00	1.00	0.21	2.83
17 Aug	0.52	20.13	0.13	183.40	0.00	1.00	0.42	3.25
18 Aug	0.54	20.67	0.00	183.40	0.00	1.00	0.63	3.88
19 Aug	0.33	21.00	0.00	183.40	0.00	1.00	0.38	4.25
20 Aug	0.29	21.29	0.00	183.40	0.00	1.00	0.33	4.58
21 Aug	0.21	21.50	0.00	183.40	0.00	1.00	0.25	4.83
22 Aug	0.17	21.67	0.04	183.44	0.00	1.00	0.21	5.04
23 Aug	0.25	21.92	0.00	183.44	0.00	1.00	0.13	5.17

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Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
24-Aug	0.25	22.17	0.00	183.44	0.00	1.00	0.67	5.83
25-Aug	0.25	22.42	0.00	183.44	0.00	1.00	1.21	7.04
26-Aug	0.08	22.50	0.00	183.44	0.00	1.00	0.83	7.88
27-Aug	0.04	22.54	0.00	183.44	0.00	1.00	0.63	8.50
28-Aug	0.04	22.58	0.04	183.48	0.00	1.00	0.71	9.21
29-Aug	0.38	22.96	0.00	183.48	0.00	1.00	0.08	9.29
30-Aug	0.19	23.15	0.00	183.48	0.00	1.00	0.08	9.38
31-Aug	0.00	23.15	0.00	183.48	0.00	1.00	0.10	9.48
01-Sep	0.04	23.19	0.00	183.48	0.00	1.00	0.13	9.60
02-Sep	0.00	23.19	0.00	183.48	0.00	1.00	0.29	9.90
03-Sep	0.08	23.27	0.00	183.48	0.00	1.00	0.25	10.15
04-Sep	0.00	23.27	0.00	183.48	0.00	1.00	0.33	10.48
05-Sep	0.04	23.31	0.00	183.48	0.00	1.00	0.04	10.52
06-Sep	0.00	23.31	0.00	183.48	0.00	1.00	0.21	10.73
07-Sep	0.00	23.31	0.00	183.48	0.00	1.00	0.08	10.81
08-Sep	0.04	23.35	0.00	183.48	0.00	1.00	0.04	10.85
09-Sep	0.00	23.35	0.00	183.48	0.00	1.00	0.00	10.85
Total	23.35		183.48		1.00		10.85	

Appendix A5.–Expanded daily and cumulative (Cum.) migration of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2004.

Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon
02 Jun	0	0	0	0	0	0	0	0
03 Jun	1	1	0	0	0	0	0	0
04 Jun	1	2	0	0	0	0	0	0
05 Jun	0	2	0	0	0	0	0	0
06 Jun	0	2	0	0	0	0	0	0
07 Jun	1	3	0	0	0	0	0	0
08 Jun	1	4	0	0	0	0	0	0
09 Jun	5	9	0	0	1	1	0	0
10 Jun	4	13	10	10	4	5	0	0
11 Jun	6	19	3	13	0	5	0	0
12 Jun	8	27	3	16	1	6	0	0
13 Jun	15	42	2	18	2	8	0	0
14 Jun	8	50	7	25	1	9	0	0
15 Jun	7	57	11	36	0	9	0	0
16 Jun	8	65	11	47	0	9	0	0
17 Jun	5	70	31	78	0	9	0	0
18 Jun	4	74	15	93	0	9	0	0
19 Jun	7	81	23	116	0	9	0	0
20 Jun	5	86	41	157	2	11	0	0
21 Jun	2	88	47	204	0	11	0	0
22 Jun	4	92	38	242	0	11	0	0
23 Jun	6	98	28	270	1	12	0	0
24 Jun	8	106	39	309	0	12	0	0
25 Jun	6	112	27	336	1	13	0	0
26 Jun	13	125	55	391	0	13	0	0
27 Jun	2	127	47	438	0	13	0	0
28 Jun	7	134	57	495	0	13	0	0
29 Jun	4	138	48	543	0	13	0	0
30 Jun	6	144	68	611	0	13	0	0
01 Jul	12	156	65	676	2	15	0	0
02 Jul	11	167	32	708	1	16	0	0
03 Jul	11	178	40	748	1	17	0	0
04 Jul	6	184	57	805	1	18	0	0
05 Jul	10	194	46	851	0	18	0	0
06 Jul	7	201	60	911	1	19	0	0
07 Jul	6	207	59	970	1	20	0	0
08 Jul	27	234	59	1,029	1	21	0	0
09 Jul	37	271	52	1,081	0	21	0	0

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon
10 Jul	32	303	83	1,164	0	21	0	0
11 Jul	30	333	91	1,255	1	22	2	2
12 Jul	21	354	90	1,345	0	22	1	3
13 Jul	31	385	78	1,423	1	23	1	4
14 Jul	27	412	58	1,481	0	23	1	5
15 Jul	41	453	64	1,545	0	23	0	5
16 Jul	25	478	40	1,585	1	24	1	6
17 Jul	44	522	24	1,609	1	25	1	7
18 Jul	28	550	68	1,677	0	25	4	11
19 Jul	32	582	54	1,731	1	26	1	12
20 Jul	32	614	14	1,745	0	26	7	19
21 Jul	26	640	7	1,752	0	26	7	26
22 Jul	25	665	10	1,762	1	27	5	31
23 Jul	17	682	9	1,771	0	27	9	40
24 Jul	9	691	3	1,774	1	28	6	46
25 Jul	11	702	5	1,779	1	29	4	50
26 Jul	13	715	8	1,787	0	29	3	53
27 Jul	10	725	6	1,793	0	29	3	56
28 Jul	26	751	8	1,801	0	29	3	59
29 Jul	15	766	6	1,807	0	29	8	67
30 Jul	17	783	7	1,814	0	29	7	74
31 Jul	10	793	1	1,815	0	29	2	76
01 Aug	15	808	1	1,816	0	29	10	86
02 Aug	20	828	2	1,818	0	29	19	105
03 Aug	32	860	1	1,819	0	29	6	111
04 Aug	18	878	2	1,821	0	29	12	123
05 Aug	11	889	1	1,822	0	29	25	148
06 Aug	18	907	0	1,822	0	29	11	159
07 Aug	4	911	1	1,823	0	29	7	166
08 Aug	8	919	1	1,824	0	29	10	176
09 Aug	13	932	1	1,825	0	29	13	189
10 Aug	4	936	3	1,828	0	29	27	216
11 Aug	12	948	1	1,829	0	29	21	237
12 Aug	8	956	1	1,830	0	29	24	261
13 Aug	1	957	1	1,831	0	29	93	354
14 Aug	0	957	1	1,832	0	29	50	404
15 Aug	0	957	1	1,833	0	29	50	454
16 Aug	0	957	1	1,834	0	29	6	460
17 Aug	0	957	2	1,836	0	29	5	465

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon
18 Aug	1	958	0	1,836	0	29	4	469
19 Aug	1	959	1	1,837	0	29	2	471
20 Aug	1	960	0	1,837	0	29	3	474
21 Aug	0	960	0	1,837	0	29	1	475
22 Aug	1	961	0	1,837	0	29	7	482
23 Aug	3	964	1	1,838	0	29	13	495
24 Aug	3	967	0	1,838	0	29	16	511
25 Aug	1	968	1	1,839	0	29	20	531
26 Aug	1	969	2	1,841	0	29	28	559
27 Aug	2	971	0	1,841	0	29	17	576
28 Aug	0	971	0	1,841	0	29	0	576
29 Aug	0	971	2	1,843	0	29	10	586
30 Aug	1	972	5	1,848	0	29	20	606
31 Aug	2	974	1	1,849	0	29	22	628
01 Sep	0	974	1	1,850	0	29	32	660
02 Sep	1	975	4	1,854	0	29	22	682
03 Sep	0	975	0	1,854	0	29	12	694
04 Sep	0	975	0	1,854	0	29	0	694
05 Sep	0	975	1	1,855	0	29	13	707
06 Sep	1	976	3	1,858	0	29	26	733
07 Sep	1	977	1	1,859	0	29	28	761
08 Sep	0	977	1	1,860	0	29	15	776
09 Sep	1	978	2	1,862	0	29	36	812
10 Sep	0	978	1	1,863	0	29	17	829
Total	978		1,863		29		829	

*Note:* The box within the column indicates the first to third quartiles of the cumulative test fishery catch whereas the midpoint of the test fishery catch is indicated by the box with bold text.

Appendix A6.–Daily and cumulative (Cum.) CPUE of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2004.

Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
02 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
03 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
09 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 Jun	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00
11 Jun	0.13	0.13	0.13	0.13	0.17	0.21	0.00	0.00
12 Jun	0.25	0.38	0.13	0.25	0.00	0.21	0.00	0.00
13 Jun	0.33	0.71	0.13	0.38	0.04	0.25	0.00	0.00
14 Jun	0.63	1.33	0.08	0.46	0.08	0.33	0.00	0.00
15 Jun	0.33	1.67	0.29	0.75	0.04	0.38	0.00	0.00
16 Jun	0.29	1.96	0.46	1.21	0.00	0.38	0.00	0.00
17 Jun	0.33	2.29	0.46	1.67	0.00	0.38	0.00	0.00
18 Jun	0.21	2.50	1.29	2.96	0.00	0.38	0.00	0.00
19 Jun	0.17	2.67	0.63	3.58	0.00	0.38	0.00	0.00
20 Jun	0.29	2.96	0.96	4.54	0.00	0.38	0.00	0.00
21 Jun	0.21	3.17	1.71	6.25	0.08	0.46	0.00	0.00
22 Jun	0.08	3.25	1.96	8.21	0.00	0.46	0.00	0.00
23 Jun	0.17	3.42	1.58	9.79	0.00	0.46	0.00	0.00
24 Jun	0.25	3.67	1.17	10.96	0.04	0.50	0.00	0.00
25 Jun	0.33	4.00	1.63	12.58	0.00	0.50	0.00	0.00
26 Jun	0.25	4.25	1.13	13.71	0.04	0.54	0.00	0.00
27 Jun	0.54	4.79	2.29	16.00	0.00	0.54	0.00	0.00
28 Jun	0.08	4.88	1.96	17.96	0.00	0.54	0.00	0.00
29 Jun	0.29	5.17	2.38	20.33	0.00	0.54	0.00	0.00
30 Jun	0.17	5.33	2.00	22.33	0.00	0.54	0.00	0.00
01 Jul	0.25	5.58	2.83	25.17	0.00	0.54	0.00	0.00
02 Jul	0.50	6.08	2.71	27.88	0.08	0.63	0.00	0.00
03 Jul	0.46	6.54	1.33	29.21	0.04	0.67	0.00	0.00
04 Jul	0.46	7.00	1.67	30.88	0.04	0.71	0.00	0.00
05 Jul	0.25	7.25	2.38	33.25	0.04	0.75	0.00	0.00
06 Jul	0.42	7.67	1.92	35.17	0.00	0.75	0.00	0.00
07 Jul	0.29	7.96	2.50	37.67	0.04	0.79	0.00	0.00
08 Jul	0.25	8.21	2.46	40.13	0.04	0.83	0.00	0.00
09 Jul	1.13	9.33	2.46	42.58	0.04	0.88	0.00	0.00
10 Jul	1.54	10.88	2.17	44.75	0.00	0.88	0.00	0.00
11 Jul	1.33	12.21	3.46	48.21	0.00	0.88	0.00	0.00
12 Jul	1.25	13.46	3.79	52.00	0.04	0.92	0.00	0.00

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Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
13 Jul	0.88	14.33	3.75	55.75	0.00	0.92	0.00	0.00
14 Jul	1.29	15.63	3.25	59.00	0.04	0.96	0.00	0.00
15 Jul	1.13	16.75	2.42	61.42	0.00	0.96	0.00	0.00
16 Jul	1.71	18.46	2.67	64.08	0.00	0.96	0.00	0.00
17 Jul	1.04	19.50	1.67	65.75	0.04	1.00	0.00	0.00
18 Jul	1.83	21.33	1.00	66.75	0.04	1.04	0.00	0.00
19 Jul	1.17	22.50	2.83	69.58	0.00	1.04	0.04	0.04
20 Jul	1.33	23.83	2.25	71.83	0.04	1.08	0.04	0.08
21 Jul	1.33	25.17	0.58	72.42	0.00	1.08	0.29	0.38
22 Jul	1.08	26.25	0.29	72.71	0.00	1.08	0.29	0.67
23 Jul	1.04	27.29	0.42	73.13	0.04	1.13	0.21	0.88
24 Jul	0.71	28.00	0.38	73.50	0.00	1.13	0.38	1.25
25 Jul	0.38	28.38	0.38	73.88	0.13	1.25	0.75	2.00
26 Jul	0.46	28.83	0.35	74.23	0.06	1.31	0.44	2.44
27 Jul	0.54	29.38	0.33	74.56	0.00	1.31	0.13	2.56
28 Jul	0.42	29.79	0.25	74.81	0.00	1.31	0.13	2.69
29 Jul	1.08	30.88	0.33	75.15	0.00	1.31	0.13	2.81
30 Jul	0.63	31.50	0.25	75.40	0.00	1.31	0.33	3.15
31 Jul	0.71	32.21	0.29	75.69	0.00	1.31	0.29	3.44
01 Aug	1.25	33.46	0.13	75.81	0.00	1.31	0.25	3.69
02 Aug	1.04	34.50	0.10	75.92	0.00	1.31	0.52	4.21
03 Aug	0.83	35.33	0.08	76.00	0.00	1.31	0.79	5.00
04 Aug	0.79	36.13	0.04	76.04	0.00	1.31	0.25	5.25
05 Aug	0.75	36.88	0.08	76.13	0.00	1.31	0.50	5.75
06 Aug	0.46	37.33	0.04	76.17	0.00	1.31	1.04	6.79
07 Aug	0.75	38.08	0.00	76.17	0.00	1.31	0.46	7.25
08 Aug	0.50	38.58	0.13	76.29	0.00	1.31	0.88	8.13
09 Aug	0.52	39.10	0.08	76.38	0.00	1.31	0.71	8.83
10 Aug	0.54	39.65	0.04	76.42	0.00	1.31	0.54	9.38
11 Aug	0.17	39.81	0.13	76.54	0.00	1.31	1.13	10.50
12 Aug	0.50	40.31	0.04	76.58	0.00	1.31	0.88	11.38
13 Aug	0.33	40.65	0.04	76.63	0.00	1.31	1.00	12.38
14 Aug	0.04	40.69	0.04	76.67	0.00	1.31	3.88	16.25
15 Aug	0.03	40.72	0.04	76.71	0.00	1.31	0.00	16.25
16 Aug	0.01	40.73	0.04	76.75	0.00	1.31	1.46	17.71
17 Aug	0.00	40.73	0.04	76.79	0.00	1.31	0.25	17.96
18 Aug	0.00	40.73	0.08	76.88	0.00	1.31	0.21	18.17
19 Aug	0.04	40.77	0.00	76.88	0.00	1.31	0.17	18.33
20 Aug	0.04	40.81	0.04	76.92	0.00	1.31	0.08	18.42
21 Aug	0.04	40.85	0.00	76.92	0.00	1.31	0.13	18.54
22 Aug	0.00	40.85	0.00	76.92	0.00	1.31	0.13	18.67
23 Aug	0.06	40.92	0.02	76.94	0.00	1.31	0.33	19.00

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Date	Chum	Chum	Pink	Pink	Chinook	Chinook	Coho	Coho
	Salmon	Salmon	Salmon	Salmon	Salmon	Salmon	Salmon	Salmon
	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE
24 Aug	0.13	41.04	0.04	76.98	0.00	1.31	0.54	19.54
25 Aug	0.13	41.17	0.00	76.98	0.00	1.31	0.67	20.21
26 Aug	0.04	41.21	0.04	77.02	0.00	1.31	0.83	21.04
27 Aug	0.04	41.25	0.08	77.10	0.00	1.31	1.17	22.21
28 Aug	0.08	41.33	0.00	77.10	0.00	1.31	0.71	22.92
29 Aug	0.00	41.33	0.00	77.10	0.00	1.31	0.00	22.92
30 Aug	0.02	41.35	0.02	77.13	0.00	1.31	0.42	23.33
31 Aug	0.04	41.40	0.04	77.17	0.00	1.31	0.83	24.17
01 Sep	0.08	41.48	0.00	77.17	0.00	1.31	0.92	25.08
02 Sep	0.00	41.48	0.04	77.21	0.00	1.31	1.33	26.42
03 Sep	0.04	41.52	0.08	77.29	0.00	1.31	0.92	27.33
04 Sep	0.00	41.52	0.00	77.29	0.00	1.31	0.50	27.83
05 Sep	0.00	41.52	0.00	77.29	0.00	1.31	0.00	27.83
06 Sep	0.02	41.54	0.00	77.29	0.00	1.31	0.54	28.38
07 Sep	0.04	41.58	0.00	77.29	0.00	1.31	1.08	29.46
08 Sep	0.04	41.63	0.00	77.29	0.00	1.31	1.17	30.63
09 Sep	0.00	41.63	0.00	77.29	0.00	1.31	0.63	31.25
10 Sep	0.04	41.67	0.00	77.29	0.00	1.31	1.50	32.75
11 Sep	0.00	41.67	0.00	77.29	0.00	1.31	0.71	33.46
Total	41.67		77.29		1.31		33.46	

Appendix A7.—Expanded daily and cumulative (Cum.) migration of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2005.

Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
4 Jun	0	0	0	0	0	0	0	0	0	0
5 Jun	0	0	0	0	0	0	0	0	0	0
6 Jun	0	0	0	0	0	0	0	0	0	0
7 Jun	0	0	0	0	0	0	0	0	0	0
8 Jun	0	0	0	0	0	0	0	0	0	0
9 Jun	0	0	0	0	0	0	0	0	0	0
10 Jun	1	1	0	0	0	0	0	0	0	0
11 Jun	1	2	0	0	0	0	0	0	0	0
12 Jun	0	2	0	0	1	1	0	0	0	0
13 Jun	0	2	0	0	0	1	0	0	0	0
14 Jun	1	3	0	0	0	1	0	0	0	0
15 Jun	0	3	0	0	0	1	0	0	0	0
16 Jun	0	3	0	0	0	1	0	0	0	0
17 Jun	0	3	0	0	0	1	0	0	0	0
18 Jun	8	11	0	0	9	10	0	0	0	0
19 Jun	7	18	0	0	9	19	0	0	0	0
20 Jun	23	41	1	1	5	24	0	0	0	0
21 Jun	16	57	0	1	5	29	0	0	0	0
22 Jun	10	67	1	2	3	32	0	0	0	0
23 Jun	17	84	2	4	8	40	0	0	0	0
24 Jun	25	109	1	5	6	46	0	0	0	0
25 Jun	27	136	8	13	7	53	0	0	0	0
26 Jun	20	156	6	19	4	57	0	0	0	0
27 Jun	39	195	15	34	3	60	0	0	0	0
28 Jun	40	235	22	56	1	61	0	0	0	0
29 Jun	33	268	51	107	0	61	0	0	0	0
30 Jun	25	293	63	170	2	63	0	0	0	0
1 Jul	35	328	108	278	1	64	1	1	0	0
2 Jul	26	354	83	361	2	66	0	1	1	1
3 Jul	43	397	64	425	1	67	0	1	0	1
4 Jul	22	419	99	524	0	67	0	1	1	2
5 Jul	21	440	69	593	3	70	0	1	0	2
6 Jul	20	460	51	644	3	73	0	1	1	3
7 Jul	15	475	91	735	0	73	0	1	0	3
8 Jul	31	506	62	797	1	74	0	1	1	4
9 Jul	61	567	76	873	1	75	0	1	2	6
10 Jul	73	640	58	931	1	76	0	1	3	9
11 Jul	69	709	151	1,082	2	78	1	2	0	9

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
12 Jul	53	762	138	1,220	0	78	3	5	0	9
13 Jul	44	806	137	1,357	0	78	2	7	0	9
14 Jul	36	842	142	1,499	0	78	3	10	0	9
15 Jul	10	852	305	1,804	0	78	1	11	0	9
16 Jul	7	859	192	<b>1,996</b>	0	78	0	11	0	9
17 Jul	12	871	237	2,233	0	78	4	15		9
18 Jul	16	887	281	2,514	0	78	8	23	0	9
19 Jul	31	918	159	2,673	0	78	7	30	0	9
20 Jul	21	939	211	2,884	0	78	9	39	1	10
21 Jul	17	956	162	3,046	0	78	12	51	2	12
22 Jul	11	967	205	3,251	0	78	12	63	2	14
23 Jul	16	983	74	3,325	0	78	5	68	2	16
24 Jul	16	999	91	3,416	0	78	6	74	2	18
25 Jul	15	1,014	107	3,523	0	78	6	80	2	20
26 Jul	15	1,029	35	3,558	0	78	5	85	3	23
27 Jul	8	1,037	62	3,620	0	78	11	96	1	24
28 Jul	7	1,044	48	3,668	0	78	6	102	0	24
29 Jul	14	1,058	38	3,706	0	78	11	113	7	31
30 Jul	20	1,078	16	3,722	0	78	2	115	0	31
31 Jul	14	1,092	26	3,748	0	78	7	122	1	<b>32</b>
1 Aug	8	1,100	35	3,783	0	78	11	133	1	33
2 Aug	9	1,109	35	3,818	0	78	13	146	2	35
3 Aug	5	1,114	33	3,851	0	78	15	161	0	35
4 Aug	13	1,127	25	3,876	0	78	9	170	2	37
5 Aug	6	1,133	40	3,916	0	78	33	203	0	37
6 Aug	5	1,138	9	3,925	0	78	38	241	0	37
7 Aug	10	1,148	7	3,932	0	78	33	274	2	39
8 Aug	16	1,164	6	3,938	0	78	27	301	3	42
9 Aug	4	1,168	5	3,943	0	78	29	330	1	43
10 Aug	3	1,171	1	3,944	0	78	24	354	1	44
11 Aug	1	1,172	1	3,945	0	78	14	368	1	45
12 Aug	4	1,176	1	3,946	0	78	23	391	3	48
13 Aug	0	1,176	0	3,946	0	78	7	398	0	48
14 Aug	1	1,177	0	3,946	0	78	22	420	0	48
15 Aug	2	1,179	0	3,946	0	78	37	457	0	48
16 Aug	1	1,180	1	3,947	0	78	39	496	4	52
17 Aug	2	1,182	0	3,947	0	78	13	509	0	52
18 Aug	2	1,184	1	3,948	0	78	13	522	0	52
19 Aug	0	1,184	0	3,948	0	78	51	<b>573</b>	0	52
20 Aug	0	1,184	0	3,948	0	78	34	607	0	52

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
21 Aug	2	1,186	0	3,948	0	78	39	646	0	52
22 Aug	4	1,190	0	3,948	0	78	44	690	1	53
23 Aug	1	1,191	0	3,948	0	78	12	702	0	53
24 Aug	0	1,191	1	3,949	0	78	60	762	0	53
25 Aug	2	1,193	2	3,951	0	78	55	817	0	53
26 Aug	3	1,196	1	3,952	0	78	48	865	3	56
27 Aug	0	1,196	0	3,952	0	78	16	881	0	56
28 Aug	0	1,196	0	3,952	0	78	22	903	0	56
29 Aug	1	1,197	0	3,952	0	78	27	930	1	57
30 Aug	1	1,198	0	3,952	0	78	25	955	2	59
31 Aug	1	1,199	0	3,952	0	78	28	983	3	62
1 Sep	0	1,199	0	3,952	0	78	17	1,000	0	62
2 Sep	1	1,200	0	3,952	0	78	15	1,015	1	63
3 Sep	0	1,200	0	3,952	0	78	1	1,016	0	63
4 Sep	0	1,200	0	3,952	0	78	10	1,026	0	63
5 Sep	3	1,203	0	3,952	0	78	18	1,044	0	63
6 Sep	3	1,206	0	3,952	0	78	14	1,058	0	63
7 Sep	3	1,209	0	3,952	0	78	13	1,071	0	63
8 Sep	0	1,209	0	3,952	0	78	9	1,080	0	63
9 Sep	0	1,209	0	3,952	0	78	0	1,080	0	63
Total	1,209		3,952		78		1,080		63	

*Note:* The box within the column indicates the first to third quartiles of the cumulative test fishery catch whereas the midpoint of the test fishery catch is indicated by the box with bold text.

Appendix A8.—Daily and cumulative (Cum.) CPUE of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2005.

Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
4 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 Jun	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00
13 Jun	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
14 Jun	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
15 Jun	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
16 Jun	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
17 Jun	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
18 Jun	0.04	0.04	0.00	0.00	0.38	0.42	0.00	0.00
19 Jun	0.29	0.33	0.00	0.00	0.38	0.79	0.00	0.00
20 Jun	0.96	1.29	0.04	0.04	0.21	1.00	0.00	0.00
21 Jun	0.67	1.96	0.00	0.04	0.21	1.21	0.00	0.00
22 Jun	0.42	2.38	0.04	0.08	0.13	1.33	0.00	0.00
23 Jun	0.71	3.08	0.08	0.17	0.33	1.67	0.00	0.00
24 Jun	1.04	4.13	0.04	0.21	0.25	1.92	0.00	0.00
25 Jun	1.13	5.25	0.33	0.54	0.29	2.21	0.00	0.00
26 Jun	0.83	6.08	0.25	0.79	0.17	2.38	0.00	0.00
27 Jun	1.63	7.71	0.63	1.42	0.13	2.50	0.00	0.00
28 Jun	1.67	9.38	0.92	2.33	0.04	2.54	0.00	0.00
29 Jun	1.38	10.75	2.13	4.46	0.00	2.54	0.00	0.00
30 Jun	1.04	11.79	2.63	7.08	0.08	2.63	0.00	0.00
1 Jul	1.46	13.25	4.50	11.58	0.04	2.67	0.00	0.00
2 Jul	1.08	14.33	3.46	15.04	0.08	2.75	0.00	0.00
3 Jul	1.79	16.13	2.67	17.71	0.04	2.79	0.00	0.00
4 Jul	0.92	17.04	4.13	21.83	0.00	2.79	0.00	0.00
5 Jul	0.88	17.92	2.88	24.71	0.13	2.92	0.00	0.00
6 Jul	0.83	18.75	2.13	26.83	0.13	3.04	0.00	0.00
7 Jul	0.63	19.38	3.79	30.63	0.00	3.04	0.00	0.00
8 Jul	1.29	20.67	2.58	33.21	0.04	3.08	0.00	0.00
9 Jul	2.54	23.21	3.17	36.38	0.04	3.13	0.00	0.00
10 Jul	3.04	26.25	2.42	38.79	0.04	3.17	0.00	0.00
11 Jul	2.88	29.13	6.29	45.08	0.08	3.25	0.00	0.00
12 Jul	2.21	31.33	5.75	50.83	0.00	3.25	0.00	0.00
13 Jul	1.83	33.17	5.71	56.54	0.00	3.25	0.00	0.00
14 Jul	1.50	34.67	5.92	62.46	0.00	3.25	0.00	0.00

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Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
15 Jul	0.42	35.08	12.71	75.17	0.00	3.25	0.04	0.04
16 Jul	0.88	35.96	24.00	99.17	0.00	3.25	0.00	0.04
17 Jul	0.77	36.73	17.85	117.02	0.00	3.25	0.17	0.21
18 Jul	0.67	37.40	11.71	128.73	0.00	3.25	0.33	0.54
19 Jul	1.29	38.69	6.63	135.35	0.00	3.25	0.29	0.83
20 Jul	0.88	39.56	8.79	144.15	0.00	3.25	0.38	1.21
21 Jul	0.71	40.27	6.75	150.90	0.00	3.25	0.50	1.71
22 Jul	0.46	40.73	8.54	159.44	0.00	3.25	0.50	2.21
23 Jul	2.00	42.73	9.25	168.69	0.00	3.25	0.63	2.83
24 Jul	1.31	44.04	4.94	173.63	0.00	3.25	0.44	3.27
25 Jul	0.63	44.67	0.63	174.25	0.00	3.25	0.25	3.52
26 Jul	0.63	45.29	0.63	174.88	0.00	3.25	0.21	3.73
27 Jul	0.33	45.63	0.33	175.21	0.00	3.25	0.46	4.19
28 Jul	0.29	45.92	0.29	175.50	0.00	3.25	0.25	4.44
29 Jul	0.58	46.50	0.58	176.08	0.00	3.25	0.46	4.89
30 Jul	2.50	49.00	2.50	178.58	0.00	3.25	0.25	5.14
31 Jul	1.58	50.58	2.71	181.29	0.00	3.25	0.58	5.73
1 Aug	0.67	51.25	2.92	184.21	0.00	3.25	0.92	6.64
2 Aug	0.38	51.63	1.46	185.67	0.00	3.25	0.54	7.19
3 Aug	0.21	51.83	1.38	187.04	0.00	3.25	0.63	7.81
4 Aug	0.54	52.38	1.04	188.08	0.00	3.25	0.38	8.19
5 Aug	0.25	52.63	1.67	189.75	0.00	3.25	1.38	9.56
6 Aug	0.63	53.25	1.13	190.88	0.00	3.25	4.75	14.31
7 Aug	0.65	53.90	0.69	191.56	0.00	3.25	2.94	17.25
8 Aug	0.67	54.56	0.25	191.81	0.00	3.25	1.13	18.37
9 Aug	0.17	54.73	0.21	192.02	0.00	3.25	1.21	19.58
10 Aug	0.13	54.85	0.04	192.06	0.00	3.25	1.00	20.58
11 Aug	0.04	54.90	0.04	192.10	0.00	3.25	0.58	21.17
12 Aug	0.17	55.06	0.04	192.15	0.00	3.25	0.96	22.12
13 Aug	0.00	55.06	0.00	192.15	0.00	3.25	0.50	22.62
14 Aug	0.04	55.10	0.00	192.15	0.00	3.25	1.02	23.64
15 Aug	0.08	55.19	0.00	192.15	0.00	3.25	1.54	25.19
16 Aug	0.04	55.23	0.04	192.19	0.00	3.25	1.63	26.81
17 Aug	0.14	55.37	0.00	192.19	0.00	3.25	0.91	27.72
18 Aug	0.25	55.62	0.13	192.31	0.00	3.25	1.63	29.35
19 Aug	0.00	55.62	0.00	192.31	0.00	3.25	2.13	31.47
20 Aug	0.00	55.62	0.00	192.31	0.00	3.25	4.25	35.72
21 Aug	0.08	55.70	0.00	192.31	0.00	3.25	3.04	38.76
22 Aug	0.17	55.87	0.00	192.31	0.00	3.25	1.83	40.60
23 Aug	0.04	55.91	0.00	192.31	0.00	3.25	0.50	41.10
24 Aug	0.00	55.91	0.04	192.35	0.00	3.25	2.50	43.60
25 Aug	0.08	55.99	0.08	192.44	0.00	3.25	2.29	45.89

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Date	Chum Salmon	Chum Salmon	Pink Salmon	Pink Salmon	Chinook Salmon	Chinook Salmon	Coho Salmon	Coho Salmon
	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE
26 Aug	0.13	56.12	0.04	192.48	0.00	3.25	2.00	47.89
27 Aug	0.00	56.12	0.00	192.48	0.00	3.25	2.00	49.89
28 Aug	0.02	56.14	0.00	192.48	0.00	3.25	1.56	51.45
29 Aug	0.04	56.18	0.00	192.48	0.00	3.25	1.13	52.58
30 Aug	0.04	56.22	0.00	192.48	0.00	3.25	1.04	53.62
31 Aug	0.04	56.27	0.00	192.48	0.00	3.25	1.17	54.79
1 Sep	0.00	56.27	0.00	192.48	0.00	3.25	0.71	55.49
2 Sep	0.04	56.31	0.00	192.48	0.00	3.25	0.63	56.12
3 Sep	0.00	56.31	0.00	192.48	0.00	3.25	0.13	56.24
4 Sep	0.06	56.37	0.00	192.48	0.00	3.25	0.44	56.68
5 Sep	0.13	56.49	0.00	192.48	0.00	3.25	0.75	57.43
6 Sep	0.13	56.62	0.00	192.48	0.00	3.25	0.58	58.01
7 Sep	0.13	56.74	0.00	192.48	0.00	3.25	0.54	58.56
8 Sep	0.00	56.74	0.00	192.48	0.00	3.25	0.38	58.93
9 Sep	0.00	56.74	0.00	192.48	0.00	3.25	0.00	58.93
Total	56.74		192.48		3.25		58.93	

Appendix A9.—Expanded daily and cumulative (Cum.) migration of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2006.

Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
8 Jun	0	0	0	0	0	0	0	0	0	0
9 Jun	0	0	0	0	0	0	0	0	0	0
10 Jun	0	0	0	0	0	0	0	0	0	0
11 Jun	0	0	0	0	0	0	0	0	0	0
12 Jun	0	0	0	0	0	0	0	0	0	0
13 Jun	1	1	1	1	0	0	0	0	0	0
14 Jun	2	3	2	3	0	0	0	0	0	0
15 Jun	2	5	15	18	1	1	0	0	0	0
16 Jun	13	18	15	33	0	1	0	0	0	0
17 Jun	25	43	17	50	2	3	0	0	0	0
18 Jun	39	82	26	76	0	3	0	0	0	0
19 Jun	42	124	17	93	2	5	0	0	0	0
20 Jun	32	156	7	100	4	9	0	0	0	0
21 Jun	31	187	51	151	3	12	0	0	0	0
22 Jun	30	217	123	274	1	13	0	0	0	0
23 Jun	51	268	56	330	3	16	0	0	0	0
24 Jun	78	346	23	353	2	18	0	0	0	0
25 Jun	75	421	44	397	0	18	0	0	0	0
26 Jun	49	470	60	457	4	22	0	0	0	0
27 Jun	48	518	62	519	3	25	0	0	0	0
28 Jun	51	569	62	581	3	28	0	0	0	0
29 Jun	95	664	60	641	3	31	0	0	0	0
30 Jun	76	<b>740</b>	166	807	10	<b>41</b>	0	0	0	0
1 Jul	59	799	369	1,176	2	43	1	1	15	15
2 Jul	97	896	180	1,356	1	44	0	1	0	15
3 Jul	51	947	148	1,504	0	44	0	1	0	15
4 Jul	27	974	149	1,653	0	44	0	1	0	15
5 Jul	14	988	181	1,834	0	44	0	1	0	15
6 Jul	12	1,000	190	2,024	0	44	0	1	0	15
7 Jul	8	1,008	229	2,253	0	44	0	1	0	15
8 Jul	13	1,021	244	2,497	1	45	0	1	0	15
9 Jul	14	1,035	271	2,768	0	45	0	1	1	16
10 Jul	7	1,042	236	3,004	0	45	0	1	1	17
11 Jul	20	1,062	216	3,220	0	45	2	3	0	17
12 Jul	24	1,086	236	3,456	1	46	9	12	1	18
13 Jul	43	1,129	144	3,600	12	58	9	21	0	18
14 Jul	53	1,182	282	<b>3,882</b>	6	64	17	38	2	20
15 Jul	65	1,247	152	4,034	3	67	20	58	1	21

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
16 Jul	33	1,280	340	4,374	6	73	18	76	3	<b>24</b>
17 Jul	9	1,289	360	4,734	1	74	10	86	0	24
18 Jul	16	1,305	276	5,010	3	77	25	111	0	24
19 Jul	16	1,321	395	5,405	1	78	15	126	4	28
20 Jul	11	1,332	311	5,716	0	78	5	131	2	30
21 Jul	8	1,340	269	5,985	0	78	3	134	1	31
22 Jul	5	1,345	281	6,266	0	78	2	136	0	31
23 Jul	4	1,349	260	6,526	0	78	7	143	2	33
24 Jul	6	1,355	195	6,721	0	78	2	145	0	33
25 Jul	3	1,358	169	6,890	0	78	7	152	0	33
26 Jul	6	1,364	156	7,046	1	79	3	155	0	33
27 Jul	8	1,372	150	7,196	0	79	7	162	0	33
28 Jul	9	1,381	89	7,285	0	79	9	171	0	33
29 Jul	14	1,395	85	7,370	0	79	15	186	1	34
30 Jul	13	1,408	30	7,400	0	79	14	200	1	35
31 Jul	4	1,412	18	7,418	0	79	13	213	0	35
1 Aug	3	1,415	31	7,449	0	79	11	224	0	35
2 Aug	8	1,423	21	7,470	0	79	14	238	0	35
3 Aug	3	1,426	28	7,498	0	79	18	256	0	35
4 Aug	1	1,427	15	7,513	0	79	12	268	0	35
5 Aug	6	1,433	19	7,532	0	79	32	300	1	36
6 Aug	9	1,442	19	7,551	0	79	94	394	0	36
7 Aug	5	1,447	10	7,561	0	79	51	445	0	36
8 Aug	1	1,448	8	7,569	0	79	59	504	1	37
9 Aug	1	1,449	6	7,575	0	79	46	550	0	37
10 Aug	3	1,452	3	7,578	0	79	47	597	0	37
11 Aug	1	1,453	2	7,580	0	79	42	639	0	37
12 Aug	0	1,453	0	7,580	0	79	53	692	0	37
13 Aug	1	1,454	0	7,580	0	79	57	749	1	38
14 Aug	5	1,459	0	7,580	0	79	37	786	0	38
15 Aug	1	1,460	1	7,581	0	79	42	828	0	38
16 Aug	3	1,463	1	7,582	0	79	47	<b>875</b>	2	40
17 Aug	8	1,471	1	7,583	0	79	32	907	1	41
18 Aug	2	1,473	3	7,586	0	79	60	967	0	41
19 Aug	1	1,474	0	7,586	0	79	58	1,025	0	41
20 Aug	1	1,475	0	7,586	0	79	42	1,067	0	41
21 Aug	1	1,476	0	7,586	0	79	33	1,100	0	41
22 Aug	1	1,477	1	7,587	0	79	28	1,128	0	41
23 Aug	3	1,480	0	7,587	0	79	45	1,173	0	41
24 Aug	0	1,480	0	7,587	0	79	18	1,191	0	41

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
25 Aug	0	1,480	0	7,587	0	79	16	1,207	0	41
26 Aug	0	1,480	1	7,588	0	79	20	1,227	0	41
27 Aug	0	1,480	0	7,588	0	79	21	1,248	1	42
28 Aug	0	1,480	2	7,590	0	79	22	1,270	0	42
29 Aug	0	1,480	0	7,590	0	79	15	1,285	0	42
30 Aug	2	1,482	0	7,590	0	79	20	1,305	0	42
31 Aug	0	1,482	0	7,590	0	79	28	1,333	0	42
1 Sep	0	1,482	0	7,590	0	79	22	1,355	0	42
2 Sep	0	1,482	2	7,592	0	79	21	1,376	0	42
3 Sep	0	1,482	1	7,593	0	79	40	1,416	0	42
4 Sep	0	1,482	1	7,594	0	79	28	1,444	0	42
5 Sep	0	1,482	1	7,595	0	79	40	1,484	0	42
6 Sep	0	1,482	3	7,598	0	79	44	1,528	0	42
7 Sep	0	1,482	0	7,598	0	79	31	1,559	0	42
8 Sep	0	1,482	0	7,598	0	79	77	1,636	0	42
9 Sep	0	1,482	1	7,599	0	79	38	1,674	0	42
10 Sep	0	1,482	0	7,599	0	79	25	1,699	1	43
11 Sep	0	1,482	0	7,599	0	79	7	1,706	0	43
12 Sep	0	1,482	0	7,599	0	79	10	1,716	0	43
13 Sep	0	1,482	0	7,599	0	79	9	1,725	0	43
14 Sep	0	1,482	0	7,599	0	79	13	1,738	0	43
Total	1,482		7,599		79		1,738		43	

*Note:* The box within the column indicates the first to third quartiles of the cumulative test fishery catch whereas the midpoint of the test fishery catch is indicated by the box with bold text.

Appendix A10.—Daily and cumulative (Cum.) CPUE for Chinook, chum, coho, and pink salmon caught in the Unalakleet River test net, Norton Sound, 2006.

Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
8 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 Jun	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.00
14 Jun	0.08	0.13	0.08	0.13	0.00	0.00	0.00	0.00
15 Jun	0.08	0.21	0.63	0.75	0.04	0.04	0.00	0.00
16 Jun	0.54	0.75	0.63	1.38	0.00	0.04	0.00	0.00
17 Jun	1.04	1.79	0.71	2.08	0.08	0.13	0.00	0.00
18 Jun	1.63	3.42	1.08	3.17	0.00	0.13	0.00	0.00
19 Jun	1.75	5.17	0.71	3.88	0.08	0.21	0.00	0.00
20 Jun	1.33	6.50	0.29	4.17	0.17	0.38	0.00	0.00
21 Jun	1.29	7.79	2.13	6.29	0.13	0.50	0.00	0.00
22 Jun	1.25	9.04	5.13	11.42	0.04	0.54	0.00	0.00
23 Jun	2.13	11.17	2.33	13.75	0.13	0.67	0.00	0.00
24 Jun	3.25	14.42	0.96	14.71	0.08	0.75	0.00	0.00
25 Jun	3.13	17.54	1.83	16.54	0.00	0.75	0.00	0.00
26 Jun	2.04	19.58	2.50	19.04	0.17	0.92	0.00	0.00
27 Jun	2.00	21.58	2.58	21.63	0.13	1.04	0.00	0.00
28 Jun	2.13	23.71	2.58	24.21	0.13	1.17	0.00	0.00
29 Jun	3.96	27.67	2.50	26.71	0.13	1.29	0.00	0.00
30 Jun	3.17	30.83	6.92	33.63	0.42	1.71	0.00	0.00
1 Jul	2.46	33.29	15.38	49.00	0.08	1.79	0.04	0.04
2 Jul	4.04	37.33	7.50	56.50	0.04	1.83	0.00	0.04
3 Jul	2.13	39.46	6.17	62.67	0.00	1.83	0.00	0.04
4 Jul	1.13	40.58	6.21	68.88	0.00	1.83	0.00	0.04
5 Jul	0.58	41.17	7.54	76.42	0.00	1.83	0.00	0.04
6 Jul	0.50	41.67	7.92	84.33	0.00	1.83	0.00	0.04
7 Jul	0.33	42.00	9.54	93.88	0.00	1.83	0.00	0.04
8 Jul	0.54	42.54	10.17	104.04	0.04	1.88	0.00	0.04
9 Jul	0.58	43.13	11.29	115.33	0.00	1.88	0.00	0.04
10 Jul	0.29	43.42	9.83	125.17	0.00	1.88	0.00	0.04
11 Jul	0.83	44.25	9.00	134.17	0.00	1.88	0.08	0.13
12 Jul	1.00	45.25	9.83	144.00	0.04	1.92	0.38	0.50
13 Jul	1.79	47.04	6.00	150.00	0.50	2.42	0.38	0.88
14 Jul	2.21	49.25	11.75	161.75	0.25	2.67	0.71	1.58
15 Jul	2.71	51.96	6.33	168.08	0.13	2.79	0.83	2.42
16 Jul	1.38	53.33	14.17	182.25	0.25	3.04	0.75	3.17
17 Jul	0.38	53.71	15.00	197.25	0.04	3.08	0.42	3.58

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Date	Chum Salmon	Chum Salmon	Pink Salmon	Pink Salmon	Chinook Salmon	Chinook Salmon	Coho Salmon	Coho Salmon
	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE
18 Jul	0.67	54.38	11.50	208.75	0.13	3.21	1.04	4.63
19 Jul	0.67	55.04	16.46	225.21	0.04	3.25	0.63	5.25
20 Jul	0.46	55.50	12.96	238.17	0.00	3.25	0.21	5.46
21 Jul	0.33	55.83	11.21	249.38	0.00	3.25	0.13	5.58
22 Jul	0.21	56.04	11.71	261.08	0.00	3.25	0.08	5.67
23 Jul	0.17	56.21	10.83	271.92	0.00	3.25	0.29	5.96
24 Jul	0.25	56.46	8.13	280.04	0.00	3.25	0.08	6.04
25 Jul	0.13	56.58	7.04	287.08	0.00	3.25	0.29	6.33
26 Jul	0.25	56.83	6.50	293.58	0.04	3.29	0.13	6.46
27 Jul	0.33	57.17	6.25	299.83	0.00	3.29	0.29	6.75
28 Jul	0.38	57.54	3.71	303.54	0.00	3.29	0.38	7.13
29 Jul	0.58	58.13	3.54	307.08	0.00	3.29	0.63	7.75
30 Jul	0.54	58.67	1.25	308.33	0.00	3.29	0.58	8.33
31 Jul	0.17	58.83	0.75	309.08	0.00	3.29	0.54	8.88
1 Aug	0.13	58.96	1.29	310.38	0.00	3.29	0.46	9.33
2 Aug	0.33	59.29	0.88	311.25	0.00	3.29	0.58	9.92
3 Aug	0.13	59.42	1.17	312.42	0.00	3.29	0.75	10.67
4 Aug	0.04	59.46	0.63	313.04	0.00	3.29	0.50	11.17
5 Aug	0.25	59.71	0.79	313.83	0.00	3.29	1.33	12.50
6 Aug	0.38	60.08	0.79	314.63	0.00	3.29	3.92	16.42
7 Aug	0.21	60.29	0.42	315.04	0.00	3.29	2.13	18.54
8 Aug	0.04	60.33	0.33	315.38	0.00	3.29	2.46	21.00
9 Aug	0.04	60.38	0.25	315.63	0.00	3.29	1.92	22.92
10 Aug	0.13	60.50	0.13	315.75	0.00	3.29	1.96	24.88
11 Aug	0.04	60.54	0.08	315.83	0.00	3.29	1.75	26.63
12 Aug	0.00	60.54	0.00	315.83	0.00	3.29	2.21	28.83
13 Aug	0.04	60.58	0.00	315.83	0.00	3.29	2.38	31.21
14 Aug	0.21	60.79	0.00	315.83	0.00	3.29	1.54	32.75
15 Aug	0.04	60.83	0.04	315.88	0.00	3.29	1.75	34.50
16 Aug	0.13	60.96	0.04	315.92	0.00	3.29	1.96	36.46
17 Aug	0.33	61.29	0.04	315.96	0.00	3.29	1.33	37.79
18 Aug	0.08	61.38	0.13	316.08	0.00	3.29	2.50	40.29
19 Aug	0.04	61.42	0.00	316.08	0.00	3.29	2.42	42.71
20 Aug	0.04	61.46	0.00	316.08	0.00	3.29	1.75	44.46
21 Aug	0.04	61.50	0.00	316.08	0.00	3.29	1.38	45.83
22 Aug	0.04	61.54	0.04	316.13	0.00	3.29	1.17	47.00
23 Aug	0.13	61.67	0.00	316.13	0.00	3.29	1.88	48.88
24 Aug	0.00	61.67	0.00	316.13	0.00	3.29	0.75	49.63
25 Aug	0.00	61.67	0.00	316.13	0.00	3.29	0.67	50.29
26 Aug	0.00	61.67	0.04	316.17	0.00	3.29	0.83	51.13
27 Aug	0.00	61.67	0.00	316.17	0.00	3.29	0.88	52.00
28 Aug	0.00	61.67	0.08	316.25	0.00	3.29	0.92	52.92

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Date	Chum Salmon		Pink Salmon		Chinook Salmon		Coho Salmon	
	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE	CPUE	Cum. CPUE
29 Aug	0.00	61.67	0.00	316.25	0.00	3.29	0.63	53.54
30 Aug	0.08	61.75	0.00	316.25	0.00	3.29	0.83	54.38
31 Aug	0.00	61.75	0.00	316.25	0.00	3.29	1.17	55.54
1 Sep	0.00	61.75	0.00	316.25	0.00	3.29	0.92	56.46
2 Sep	0.00	61.75	0.08	316.33	0.00	3.29	0.88	57.33
3 Sep	0.00	61.75	0.04	316.38	0.00	3.29	1.67	59.00
4 Sep	0.00	61.75	0.04	316.42	0.00	3.29	1.17	60.17
5 Sep	0.00	61.75	0.04	316.46	0.00	3.29	1.67	61.83
6 Sep	0.00	61.75	0.13	316.58	0.00	3.29	1.83	63.67
7 Sep	0.00	61.75	0.00	316.58	0.00	3.29	1.29	64.96
8 Sep	0.00	61.75	0.00	316.58	0.00	3.29	3.21	68.17
9 Sep	0.00	61.75	0.04	316.63	0.00	3.29	1.58	69.75
10 Sep	0.00	61.75	0.00	316.63	0.00	3.29	1.04	70.79
11 Sep	0.00	61.75	0.00	316.63	0.00	3.29	0.29	71.08
12 Sep	0.00	61.75	0.00	316.63	0.00	3.29	0.42	71.50
13 Sep	0.00	61.75	0.00	316.63	0.00	3.29	0.38	71.88
14 Sep	0.00	61.75	0.00	316.63	0.00	3.29	0.54	72.42
Total	61.75		316.63		3.29		72.42	

Appendix A11.—Expanded daily and cumulative (Cum.) migration of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2007.

Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
4 Jun	0	0	0	0	0	0	0	0	0	0
5 Jun	0	0	0	0	0	0	0	0	0	0
6 Jun	0	0	0	0	0	0	0	0	0	0
7 Jun	0	0	0	0	0	0	0	0	0	0
8 Jun	0	0	0	0	0	0	0	0	0	0
9 Jun	0	0	0	0	0	0	0	0	0	0
10 Jun	0	0	0	0	0	0	0	0	0	0
11 Jun	0	0	0	0	0	0	0	0	0	0
12 Jun	0	0	0	0	0	0	0	0	0	0
13 Jun	0	0	0	0	0	0	0	0	0	0
14 Jun	2	2	0	0	0	0	0	0	0	0
15 Jun	1	3	0	0	0	0	0	0	0	0
16 Jun	6	9	0	0	0	0	0	0	0	0
17 Jun	20	29	0	0	2	2	0	0	0	0
18 Jun	7	36	0	0	1	3	0	0	0	0
19 Jun	6	42	0	0	0	3	0	0	0	0
20 Jun	11	53	0	0	1	4	0	0	0	0
21 Jun	11	64	0	0	2	6	0	0	0	0
22 Jun	4	68	0	0	1	7	0	0	0	0
23 Jun	5	73	0	0	0	7	0	0	0	0
24 Jun	4	77	0	0	3	10	0	0	0	0
25 Jun	5	82	0	0	2	12	0	0	0	0
26 Jun	11	93	5	5	16	28	0	0	0	0
27 Jun	7	100	3	8	10	38	0	0	0	0
28 Jun	19	119	1	9	9	47	0	0	0	0
29 Jun	12	131	6	15	9	56	0	0	0	0
30 Jun	12	143	0	15	7	63	0	0	0	0
1 Jul	14	157	8	23	6	69	0	0	0	0
2 Jul	18	175	1	24	7	76	0	0	0	0
3 Jul	9	184	1	25	4	80	0	0	0	0
4 Jul	24	208	2	27	1	81	0	0	0	0
5 Jul	21	229	4	31	0	81	0	0	1	1
6 Jul	20	249	3	34	4	85	0	0	1	2
7 Jul	30	279	5	39	2	87	0	0	0	2
8 Jul	31	310	26	65	1	88	0	0	0	2
9 Jul	23	333	10	75	0	88	0	0	1	3
10 Jul	32	365	48	123	1	89	0	0	0	3
11 Jul	24	389	27	150	2	91	0	0	1	4

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
12 Jul	32	421	36	186	0	91	0	0	0	4
13 Jul	24	445	46	232	1	92	0	0	1	5
14 Jul	21	466	48	280	1	93	1	1	0	5
15 Jul	29	<b>495</b>	79	359	1	94	4	5	2	7
16 Jul	37	532	77	436	0	94	3	8	2	9
17 Jul	43	575	53	489	1	95	5	13	1	10
18 Jul	25	600	16	505	0	95	10	23	1	11
19 Jul	24	624	30	535	1	96	3	26	1	12
20 Jul	29	653	17	552	0	96	11	37	1	13
21 Jul	13	666	40	592	0	96	3	40	0	13
22 Jul	14	680	60	652	0	96	5	45	0	13
23 Jul	14	694	107	<b>759</b>	0	96	14	59	0	13
24 Jul	16	710	59	818	0	96	8	67	0	13
25 Jul	10	720	52	870	0	96	24	91	0	13
26 Jul	10	730	40	910	0	96	19	110	0	13
27 Jul	6	736	32	942	0	96	17	127	0	13
28 Jul	7	743	8	950	0	96	21	148	0	13
29 Jul	16	759	51	1,001	0	96	40	188	1	14
30 Jul	25	784	94	1,095	0	96	58	246	1	15
31 Jul	29	813	59	1,154	0	96	23	269	0	15
1 Aug	23	836	41	1,195	0	96	31	300	0	15
2 Aug	24	860	47	1,242	0	96	52	352	0	15
3 Aug	13	873	46	1,288	0	96	56	408	1	16
4 Aug	6	879	5	1,293	0	96	27	435	0	16
5 Aug	13	892	29	1,322	0	96	56	491	1	17
6 Aug	19	911	53	1,375	0	96	84	<b>575</b>	2	<b>19</b>
7 Aug	2	913	13	1,388	0	96	83	658	0	19
8 Aug	5	918	32	1,420	0	96	53	711	0	19
9 Aug	9	927	22	1,442	0	96	50	761	1	20
10 Aug	7	934	10	1,452	0	96	22	783	2	22
11 Aug	3	937	6	1,458	0	96	18	801	1	23
12 Aug	5	942	4	1,462	0	96	24	825	2	25
13 Aug	6	948	2	1,464	0	96	30	855	2	27
14 Aug	5	953	0	1,464	0	96	23	878	5	32
15 Aug	1	954	0	1,464	0	96	21	899	1	33
16 Aug	3	957	1	1,465	0	96	8	907	1	34
17 Aug	4	961	1	1,466	0	96	19	926	0	34
18 Aug	1	962	1	1,467	0	96	5	931	1	35
19 Aug	2	964	1	1,468	0	96	11	942	1	36
20 Aug	2	966	1	1,469	0	96	16	958	1	37

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
21 Aug	1	967	0	1,469	0	96	12	970	0	37
22 Aug	2	969	1	1,470	0	96	10	980	0	37
23 Aug	1	970	0	1,470	0	96	4	984	0	37
24 Aug	2	972	0	1,470	0	96	7	991	0	37
25 Aug	0	972	0	1,470	0	96	3	994	0	37
26 Aug	0	972	0	1,470	0	96	11	1,005	0	37
27 Aug	0	972	0	1,470	0	96	18	1,023	0	37
28 Aug	1	973	0	1,470	0	96	11	1,034	0	37
29 Aug	0	973	1	1,471	0	96	7	1,041	0	37
30 Aug	2	975	0	1,471	0	96	5	1,046	1	38
31 Aug	1	976	0	1,471	0	96	9	1,055	1	39
1 Sep	1	977	0	1,471	0	96	0	1,055	0	39
2 Sep	1	978	0	1,471	0	96	2	1,057	0	39
3 Sep	0	978	0	1,471	0	96	3	1,060	0	39
4 Sep	0	978	0	1,471	0	96	5	1,065	0	39
5 Sep	0	978	0	1,471	0	96	5	1,070	0	39
6 Sep	0	978	0	1,471	0	96	4	1,074	0	39
7 Sep	0	978	0	1,471	0	96	3	1,077	0	39
8 Sep	0	978	0	1,471	0	96	3	1,080	0	39
9 Sep	0	978	0	1,471	0	96	7	1,087	0	39
Total	978		1,471		96		1,087		39	

*Note:* The box within the column indicates the first to third quartiles of the cumulative test fishery catch whereas the midpoint of the test fishery catch is indicated by the box with bold text.



Appendix A12.–Daily and cumulative (Cum.) CPUE for Chinook, chum, coho, and pink salmon caught in the Unalakleet River test net, Norton Sound, 2007.

Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
4 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14 Jun	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00
15 Jun	0.04	0.13	0.00	0.00	0.00	0.00	0.00	0.00
16 Jun	0.25	0.38	0.00	0.00	0.00	0.00	0.00	0.00
17 Jun	0.83	1.21	0.00	0.00	0.08	0.08	0.00	0.00
18 Jun	0.29	1.50	0.00	0.00	0.04	0.13	0.00	0.00
19 Jun	0.25	1.75	0.00	0.00	0.00	0.13	0.00	0.00
20 Jun	0.46	2.21	0.00	0.00	0.04	0.17	0.00	0.00
21 Jun	0.46	2.67	0.00	0.00	0.08	0.25	0.00	0.00
22 Jun	0.17	2.83	0.00	0.00	0.04	0.29	0.00	0.00
23 Jun	0.21	3.04	0.00	0.00	0.00	0.29	0.00	0.00
24 Jun	0.17	3.21	0.00	0.00	0.13	0.42	0.00	0.00
25 Jun	0.21	3.42	0.00	0.00	0.08	0.50	0.00	0.00
26 Jun	0.46	3.88	0.21	0.21	0.67	1.17	0.00	0.00
27 Jun	0.29	4.17	0.13	0.33	0.42	1.58	0.00	0.00
28 Jun	0.79	4.96	0.04	0.38	0.38	1.96	0.00	0.00
29 Jun	0.50	5.46	0.25	0.63	0.38	2.33	0.00	0.00
30 Jun	0.50	5.96	0.00	0.63	0.29	2.63	0.00	0.00
1 Jul	0.58	6.54	0.33	0.96	0.25	2.88	0.00	0.00
2 Jul	0.75	7.29	0.04	1.00	0.29	3.17	0.00	0.00
3 Jul	0.38	7.67	0.04	1.04	0.17	3.33	0.00	0.00
4 Jul	1.00	8.67	0.08	1.13	0.04	3.38	0.00	0.00
5 Jul	0.88	9.54	0.17	1.29	0.00	3.38	0.00	0.00
6 Jul	0.83	10.38	0.13	1.42	0.17	3.54	0.00	0.00
7 Jul	1.25	11.63	0.21	1.63	0.08	3.63	0.00	0.00
8 Jul	1.29	12.92	1.08	2.71	0.04	3.67	0.00	0.00
9 Jul	0.96	13.88	0.42	3.13	0.00	3.67	0.00	0.00
10 Jul	1.33	15.21	2.00	5.13	0.04	3.71	0.00	0.00
11 Jul	1.00	16.21	1.13	6.25	0.08	3.79	0.00	0.00
12 Jul	1.33	17.54	1.50	7.75	0.00	3.79	0.00	0.00
13 Jul	1.00	18.54	1.92	9.67	0.04	3.83	0.00	0.00
14 Jul	0.88	19.42	2.00	11.67	0.04	3.88	0.04	0.04

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Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
15 Jul	1.21	20.63	3.29	14.96	0.04	3.92	0.17	0.21
16 Jul	1.54	22.17	3.21	18.17	0.00	3.92	0.13	0.33
17 Jul	1.79	23.96	2.21	20.38	0.04	3.96	0.21	0.54
18 Jul	1.04	25.00	0.67	21.04	0.00	3.96	0.42	0.96
19 Jul	1.00	26.00	1.25	22.29	0.04	4.00	0.13	1.08
20 Jul	1.21	27.21	0.71	23.00	0.00	4.00	0.46	1.54
21 Jul	0.54	27.75	1.67	24.67	0.00	4.00	0.13	1.67
22 Jul	0.58	28.33	2.50	27.17	0.00	4.00	0.21	1.88
23 Jul	0.58	28.92	4.46	31.63	0.00	4.00	0.58	2.46
24 Jul	0.67	29.58	2.46	34.08	0.00	4.00	0.33	2.79
25 Jul	0.42	30.00	2.17	36.25	0.00	4.00	1.00	3.79
26 Jul	0.42	30.42	1.67	37.92	0.00	4.00	0.79	4.58
27 Jul	0.25	30.67	1.33	39.25	0.00	4.00	0.71	5.29
28 Jul	0.88	31.54	1.00	40.25	0.00	4.00	2.63	7.92
29 Jul	0.96	32.50	2.46	42.71	0.00	4.00	1.21	9.13
30 Jul	1.04	33.54	3.92	46.63	0.00	4.00	2.42	11.54
31 Jul	1.21	34.75	2.46	49.08	0.00	4.00	0.96	12.50
1 Aug	0.96	35.71	1.71	50.79	0.00	4.00	1.29	13.79
2 Aug	1.00	36.71	1.96	52.75	0.00	4.00	2.17	15.96
3 Aug	0.54	37.25	1.92	54.67	0.00	4.00	2.33	18.29
4 Aug	0.75	38.00	0.63	55.29	0.00	4.00	3.38	21.67
5 Aug	0.77	38.77	1.42	56.71	0.00	4.00	1.96	23.63
6 Aug	0.79	39.56	2.21	58.92	0.00	4.00	3.50	27.13
7 Aug	0.08	39.65	0.54	59.46	0.00	4.00	3.46	30.58
8 Aug	0.21	39.85	1.33	60.79	0.00	4.00	2.21	32.79
9 Aug	0.38	40.23	0.92	61.71	0.00	4.00	2.08	34.88
10 Aug	0.29	40.52	0.42	62.13	0.00	4.00	0.92	35.79
11 Aug	0.38	40.90	0.75	62.88	0.00	4.00	2.25	38.04
12 Aug	0.31	41.21	0.42	63.29	0.00	4.00	1.13	39.17
13 Aug	0.25	41.46	0.08	63.38	0.00	4.00	1.25	40.42
14 Aug	0.21	41.67	0.00	63.38	0.00	4.00	0.96	41.38
15 Aug	0.04	41.71	0.00	63.38	0.00	4.00	0.88	42.25
16 Aug	0.13	41.83	0.04	63.42	0.00	4.00	0.33	42.58
17 Aug	0.17	42.00	0.04	63.46	0.00	4.00	0.79	43.38
18 Aug	0.13	42.13	0.13	63.58	0.00	4.00	0.63	44.00
19 Aug	0.10	42.23	0.08	63.67	0.00	4.00	0.98	44.98
20 Aug	0.08	42.31	0.04	63.71	0.00	4.00	0.67	45.65
21 Aug	0.04	42.35	0.00	63.71	0.00	4.00	0.50	46.15
22 Aug	0.08	42.44	0.04	63.75	0.00	4.00	0.42	46.56
23 Aug	0.04	42.48	0.00	63.75	0.00	4.00	0.17	46.73
24 Aug	0.08	42.56	0.00	63.75	0.00	4.00	0.29	47.02
25 Aug	0.00	42.56	0.00	63.75	0.00	4.00	0.38	47.40

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Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
26 Aug	0.00	42.56	0.00	63.75	0.00	4.00	1.48	48.88
27 Aug	0.00	42.56	0.00	63.75	0.00	4.00	0.75	49.63
28 Aug	0.04	42.60	0.00	63.75	0.00	4.00	0.46	50.08
29 Aug	0.00	42.60	0.04	63.79	0.00	4.00	0.29	50.38
30 Aug	0.08	42.69	0.00	63.79	0.00	4.00	0.21	50.58
31 Aug	0.04	42.73	0.00	63.79	0.00	4.00	0.38	50.96
1 Sep	0.13	42.85	0.00	63.79	0.00	4.00	0.00	50.96
2 Sep	0.06	42.92	0.00	63.79	0.00	4.00	0.50	51.46
3 Sep	0.00	42.92	0.00	63.79	0.00	4.00	0.13	51.58
4 Sep	0.00	42.92	0.00	63.79	0.00	4.00	0.21	51.79
5 Sep	0.00	42.92	0.00	63.79	0.00	4.00	0.21	52.00
6 Sep	0.00	42.92	0.00	63.79	0.00	4.00	0.17	52.17
7 Sep	0.00	42.92	0.00	63.79	0.00	4.00	0.13	52.29
8 Sep	0.00	42.92	0.00	63.79	0.00	4.00	0.13	52.42
9 Sep	0.00	42.92	0.00	63.79	0.00	4.00	0.29	52.71
Total	42.92		63.79		4.00		52.71	

Appendix A13.–Expanded daily and cumulative (Cum.) migration of all salmonid species caught in the Unalakleet River test net, Norton Sound, 2008.

Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
9 Jun	0	0	0	0	0	0		0		0
10 Jun	0	0	0	0	0	0		0		0
11 Jun	1	1	0	0	0	0		0		0
12 Jun	0	1	0	0	0	0		0		0
13 Jun	1	2	1	1	0	0		0		0
14 Jun	0	2	1	2	0	0		0		0
15 Jun	1	3	0	2	0	0		0		0
16 Jun	1	4	0	2	0	0		0		0
17 Jun	1	5	4	6	1	1		0		0
18 Jun	6	11	5	11	0	1		0		0
19 Jun	6	17	1	12	1	2		0		0
20 Jun	3	20	1	13	2	4		0		0
21 Jun	6	26	6	19	0	4		0		0
22 Jun	8	34	17	36	4	8		0		0
23 Jun	20	54	9	45	5	13		0		0
24 Jun	9	63	12	57	2	15		0		0
25 Jun	4	67	18	75	0	15		0		0
26 Jun	11	78	20	95	0	15		0		0
27 Jun	12	90	32	127	3	18		0		0
28 Jun	19	109	27	154	1	19		0		0
29 Jun	18	127	38	192	1	20		0		0
30 Jun	23	150	46	238	2	22		0		0
1 Jul	15	165	41	279	0	22		0		0
2 Jul	32	197	68	347	9	31		0		0
3 Jul	20	217	67	414	11	42		0		0
4 Jul	20	237	145	559	6	48		0		0
5 Jul	16	253	97	656	7	55		0	1	1
6 Jul	17	270	89	745	4	59		0	0	1
7 Jul	34	304	46	791	7	66	1	1	0	1
8 Jul	31	335	70	861	5	71	0	1	1	2
9 Jul	43	378	57	918	18	89	0	1	1	3
10 Jul	57	435	65	983	6	95	1	2	0	3
11 Jul	32	467	36	1,019	3	98	1	3	3	6
12 Jul	71	538	54	1,073	4	102	1	4	0	6
13 Jul	67	605	47	1,120	4	106	3	7	1	7
14 Jul	74	679	45	1,165	1	107	0	7	1	8
15 Jul	79	758	45	1,210	2	109	1	8	1	9
16 Jul	111	869	115	1,325	4	113	4	12	1	10

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
17 Jul	94	963	149	<b>1,474</b>	3	116	5	17	0	10
18 Jul	71	<b>1,034</b>	137	1,611	1	117	4	21	1	<b>11</b>
19 Jul	62	1,096	113	1,724	3	120	6	27	0	11
20 Jul	66	1,162	113	1,837	1	121	10	37	0	11
21 Jul	20	1,182	106	1,943	0	121	22	59	0	11
22 Jul	27	1,209	75	2,018	1	122	11	70	1	12
23 Jul	22	1,231	82	2,100	0	122	34	104	0	12
24 Jul	11	1,242	88	2,188	0	122	20	124	0	12
25 Jul	32	1,274	83	2,271	1	123	15	139	1	13
26 Jul	14	1,288	44	2,315	0	123	9	148	0	13
27 Jul	35	1,323	74	2,389	0	123	21	169	0	13
28 Jul	56	1,379	103	2,492	0	123	32	201	0	13
29 Jul	71	1,450	61	2,553	0	123	52	253	0	13
30 Jul	64	1,514	42	2,595	0	123	33	286	1	14
31 Jul	59	1,573	21	2,616	0	123	53	339	0	14
1 Aug	54	1,627	33	2,649	0	123	46	385	1	15
2 Aug	30	1,657	10	2,659	0	123	52	437	0	15
3 Aug	28	1,685	23	2,682	0	123	66	503	1	16
4 Aug	25	1,710	35	2,717	0	123	79	582	2	18
5 Aug	29	1,739	20	2,737	0	123	60	642	0	18
6 Aug	18	1,757	8	2,745	0	123	43	685	0	18
7 Aug	30	1,787	11	2,756	0	123	30	715	2	20
8 Aug	10	1,797	12	2,768	0	123	36	751	0	20
9 Aug	8	1,805	3	2,771	0	123	27	778	0	20
10 Aug	11	1,816	2	2,773	0	123	42	820	0	20
11 Aug	14	1,830	0	2,773	0	123	56	876	0	20
12 Aug	8	1,838	0	2,773	0	123	41	917	0	20
13 Aug	4	1,842	5	2,778	0	123	34	<b>951</b>	1	21
14 Aug	5	1,847	3	2,781	0	123	34	985	0	21
15 Aug	3	1,850	1	2,782	0	123	32	1,017	0	21
16 Aug	1	1,851	0	2,782	0	123	3	1,020	0	21
17 Aug	2	1,853	1	2,783	0	123	17	1,037	0	21
18 Aug	3	1,856	1	2,784	0	123	31	1,068	0	21
19 Aug	2	1,858	0	2,784	0	123	17	1,085	0	21
20 Aug	0	1,858	1	2,785	0	123	28	1,113	0	21
21 Aug	2	1,860	0	2,785	0	123	18	1,131	0	21
22 Aug	1	1,861	0	2,785	0	123	23	1,154	0	21
23 Aug	0	1,861	1	2,786	0	123	15	1,169	0	21
24 Aug	4	1,865	1	2,787	0	123	32	1,201	0	21
25 Aug	7	1,872	1	2,788	0	123	48	1,249	0	21

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Date	Daily Chum Salmon	Cum. Chum Salmon	Daily Pink Salmon	Cum. Pink Salmon	Daily Chinook Salmon	Cum. Chinook Salmon	Daily Coho Salmon	Cum. Coho Salmon	Daily Sockeye Salmon	Cum. Sockeye Salmon
26 Aug	2	1,874	0	2,788	0	123	39	1,288	0	21
27 Aug	9	1,883	1	2,789	0	123	43	1,331	0	21
28 Aug	4	1,887	0	2,789	0	123	42	1,373	0	21
29 Aug	10	1,897	2	2,791	0	123	48	1,421	0	21
30 Aug	4	1,901	0	2,791	0	123	13	1,434	0	21
31 Aug	6	1,907	0	2,791	0	123	29	1,463	0	21
1 Sep	7	1,914	0	2,791	0	123	44	1,507	0	21
2 Sep	4	1,918	0	2,791	0	123	41	1,548	0	21
3 Sep	3	1,921	0	2,791	0	123	37	1,585	0	21
4 Sep	2	1,923	0	2,791	0	123	33	1,618	0	21
5 Sep	1	1,924	0	2,791	0	123	36	1,654	0	21
6 Sep	1	1,925	0	2,791	0	123	18	1,672	0	21
7 Sep	1	1,926	0	2,791	0	123	38	1,710	0	21
8 Sep	1	1,927	1	2,792	0	123	57	1,767	0	21
9 Sep	2	1,929	0	2,792	0	123	43	1,810	0	21
10 Sep	1	1,930	0	2,792	0	123	48	1,858	0	21
11 Sep	1	1,931	0	2,792	0	123	58	1,916	0	21
12 Sep	1	1,932	0	2,792	0	123	60	1,976	0	21
13 Sep	0	1,932	0	2,792	0	123	12	1,988	0	21
Total	1,932		2,792		123		1,988		21	

*Note:* The box within the column indicates the first to third quartiles of the cumulative test fishery catch whereas the midpoint of the test fishery catch is indicated by the box with bold text.

Appendix A14.—Daily and cumulative (Cum.) CPUE for Chinook, chum, coho, and pink salmon caught in the Unalakleet River test net, Norton Sound, 2008.

Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
9 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 Jun	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 Jun	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00
12 Jun	0.00	0.04	0.00	0.00	0.04	0.04	0.00	0.00
13 Jun	0.04	0.08	0.04	0.04	0.00	0.04	0.00	0.00
14 Jun	0.00	0.08	0.04	0.08	0.04	0.08	0.00	0.00
15 Jun	0.04	0.13	0.00	0.08	0.08	0.17	0.00	0.00
16 Jun	0.04	0.17	0.00	0.08	0.00	0.17	0.00	0.00
17 Jun	0.04	0.21	0.17	0.25	0.17	0.33	0.00	0.00
18 Jun	0.25	0.46	0.21	0.46	0.21	0.54	0.00	0.00
19 Jun	0.25	0.71	0.04	0.50	0.08	0.63	0.00	0.00
20 Jun	0.13	0.83	0.04	0.54	0.00	0.63	0.00	0.00
21 Jun	0.25	1.08	0.25	0.79	0.00	0.63	0.00	0.00
22 Jun	0.33	1.42	0.71	1.50	0.13	0.75	0.00	0.00
23 Jun	0.83	2.25	0.38	1.88	0.04	0.79	0.00	0.00
24 Jun	0.38	2.63	0.50	2.38	0.04	0.83	0.00	0.00
25 Jun	0.17	2.79	0.75	3.13	0.08	0.92	0.00	0.00
26 Jun	0.46	3.25	0.83	3.96	0.00	0.92	0.00	0.00
27 Jun	0.50	3.75	1.33	5.29	0.38	1.29	0.00	0.00
28 Jun	0.79	4.54	1.13	6.42	0.46	1.75	0.00	0.00
29 Jun	0.75	5.29	1.58	8.00	0.25	2.00	0.00	0.00
30 Jun	0.96	6.25	1.92	9.92	0.29	2.29	0.00	0.00
1 Jul	0.63	6.88	1.71	11.63	0.17	2.46	0.00	0.00
2 Jul	1.33	8.21	2.83	14.46	0.29	2.75	0.00	0.00
3 Jul	0.83	9.04	2.79	17.25	0.21	2.96	0.00	0.00
4 Jul	0.83	9.88	6.04	23.29	0.75	3.71	0.00	0.00
5 Jul	0.67	10.54	4.04	27.33	0.25	3.96	0.00	0.00
6 Jul	0.71	11.25	3.71	31.04	0.13	4.08	0.00	0.00
7 Jul	1.42	12.67	1.92	32.96	0.17	4.25	0.04	0.04
8 Jul	1.29	13.96	2.92	35.88	0.17	4.42	0.00	0.04
9 Jul	1.79	15.75	2.38	38.25	0.04	4.46	0.00	0.04
10 Jul	2.38	18.13	2.71	40.96	0.08	4.54	0.04	0.08
11 Jul	1.33	19.46	1.50	42.46	0.17	4.71	0.04	0.13
12 Jul	2.96	22.42	2.25	44.71	0.13	4.83	0.04	0.17
13 Jul	2.79	25.21	1.96	46.67	0.04	4.88	0.13	0.29
14 Jul	3.08	28.29	1.88	48.54	0.13	5.00	0.00	0.29
15 Jul	3.29	31.58	1.88	50.42	0.04	5.04	0.04	0.33
16 Jul	4.63	36.21	4.79	55.21	0.00	5.04	0.17	0.50
17 Jul	3.92	40.13	6.21	61.42	0.04	5.08	0.21	0.71
18 Jul	2.96	43.08	5.71	67.13	0.00	5.08	0.17	0.88
19 Jul	2.58	45.67	4.71	71.83	0.00	5.08	0.25	1.13

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Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
20 Jul	2.75	48.42	4.71	76.54	0.04	5.13	0.42	1.54
21 Jul	0.83	49.25	4.42	80.96	0.00	5.13	0.92	2.46
22 Jul	1.13	50.38	3.13	84.08	0.00	5.13	0.46	2.92
23 Jul	0.92	51.29	3.42	87.50	0.00	5.13	1.42	4.33
24 Jul	0.46	51.75	3.67	91.17	0.00	5.13	0.83	5.17
25 Jul	1.33	53.08	3.46	94.63	0.00	5.13	0.63	5.79
26 Jul	1.40	54.48	4.40	99.03	0.00	5.13	0.90	6.69
27 Jul	1.87	56.35	4.35	103.37	0.00	5.13	1.12	7.81
28 Jul	2.33	58.68	4.29	107.66	0.00	5.13	1.33	9.14
29 Jul	2.96	61.64	2.54	110.20	0.00	5.13	2.17	11.31
30 Jul	2.67	64.31	1.75	111.95	0.00	5.13	1.38	12.68
31 Jul	2.46	66.77	0.88	112.83	0.00	5.13	2.21	14.89
1 Aug	2.25	69.02	1.38	114.20	0.00	5.13	1.92	16.81
2 Aug	3.75	72.77	1.25	115.45	0.00	5.13	6.50	23.31
3 Aug	2.40	75.16	1.35	116.81	0.00	5.13	4.90	28.20
4 Aug	1.04	76.20	1.46	118.27	0.00	5.13	3.29	31.50
5 Aug	1.21	77.41	0.83	119.10	0.00	5.13	2.50	34.00
6 Aug	0.75	78.16	0.33	119.43	0.00	5.13	1.79	35.79
7 Aug	1.25	79.41	0.46	119.89	0.00	5.13	1.25	37.04
8 Aug	0.42	79.83	0.50	120.39	0.00	5.13	1.50	38.54
9 Aug	1.00	80.83	0.38	120.77	0.00	5.13	3.38	41.91
10 Aug	0.79	81.62	0.19	120.95	0.00	5.13	2.85	44.77
11 Aug	0.58	82.20	0.00	120.95	0.00	5.13	2.33	47.10
12 Aug	0.33	82.54	0.00	120.95	0.00	5.13	1.71	48.81
13 Aug	0.17	82.70	0.21	121.16	0.00	5.13	1.42	50.23
14 Aug	0.21	82.91	0.13	121.29	0.00	5.13	1.42	51.64
15 Aug	0.13	83.04	0.04	121.33	0.00	5.13	1.33	52.98
16 Aug	0.13	83.16	0.00	121.33	0.00	5.13	0.38	53.35
17 Aug	0.13	83.29	0.02	121.35	0.00	5.13	0.83	54.18
18 Aug	0.13	83.41	0.04	121.39	0.00	5.13	1.29	55.48
19 Aug	0.08	83.50	0.00	121.39	0.00	5.13	0.71	56.18
20 Aug	0.00	83.50	0.04	121.43	0.00	5.13	1.17	57.35
21 Aug	0.08	83.58	0.00	121.43	0.00	5.13	0.75	58.10
22 Aug	0.04	83.62	0.00	121.43	0.00	5.13	0.96	59.06
23 Aug	0.00	83.62	0.13	121.56	0.00	5.13	1.88	60.93
24 Aug	0.15	83.77	0.08	121.64	0.00	5.13	1.94	62.87
25 Aug	0.29	84.06	0.04	121.68	0.00	5.13	2.00	64.87
26 Aug	0.08	84.14	0.00	121.68	0.00	5.13	1.63	66.50
27 Aug	0.38	84.52	0.04	121.73	0.00	5.13	1.79	68.29
28 Aug	0.17	84.68	0.00	121.73	0.00	5.13	1.75	70.04
29 Aug	0.42	85.10	0.08	121.81	0.00	5.13	2.00	72.04
30 Aug	0.50	85.60	0.00	121.81	0.00	5.13	1.63	73.66

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Date	Chum Salmon CPUE	Chum Salmon Cum. CPUE	Pink Salmon CPUE	Pink Salmon Cum. CPUE	Chinook Salmon CPUE	Chinook Salmon Cum. CPUE	Coho Salmon CPUE	Coho Salmon Cum. CPUE
31 Aug	0.40	86.00	0.00	121.81	0.00	5.13	1.73	75.39
1 Sep	0.29	86.29	0.00	121.81	0.00	5.13	1.83	77.23
2 Sep	0.17	86.45	0.00	121.81	0.00	5.13	1.71	78.93
3 Sep	0.13	86.58	0.00	121.81	0.00	5.13	1.54	80.48
4 Sep	0.08	86.66	0.00	121.81	0.00	5.13	1.38	81.85
5 Sep	0.04	86.70	0.00	121.81	0.00	5.13	1.50	83.35
6 Sep	0.13	86.83	0.00	121.81	0.00	5.13	2.25	85.60
7 Sep	0.08	86.91	0.02	121.83	0.00	5.13	2.31	87.91
8 Sep	0.04	86.95	0.04	121.87	0.00	5.13	2.38	90.29
9 Sep	0.08	87.04	0.00	121.87	0.00	5.13	1.79	92.08
10 Sep	0.04	87.08	0.00	121.87	0.00	5.13	2.00	94.08
11 Sep	0.04	87.12	0.00	121.87	0.00	5.13	2.42	96.50
12 Sep	0.04	87.16	0.00	121.87	0.00	5.13	2.50	99.00
13 Sep	0.00	87.16	0.00	121.87	0.00	5.13	1.50	100.50
Total	85.08		117.16		5.13		101.87	

Appendix A15.—Historical midpoint dates for the commercial and test fisheries compared to the historical average, Unalakleet Subdistrict, Norton Sound, 1985–2008.

Year	Chinook Salmon		Coho Salmon		Chum Salmon		Even-Yr Pink Salmon		Odd-Yr Pink Salmon	
	Commercial Fishery	Test Fishery	Commercial Fishery	Test Fishery	Commercial Fishery	Test Fishery	Commercial Fishery	Test Fishery	Commercial Fishery	Test Fishery
1985	7/06	7/07	8/21	8/24	7/24	7/09			<sup>a</sup>	7/17
1986	6/28	6/26	8/13	8/06	7/16	7/24	<sup>a</sup>	7/03		
1987	6/26	7/10	8/15	8/30	7/11	7/23			<sup>a</sup>	7/20
1988	6/24	6/27	8/13	8/13	7/13	7/25	<sup>a</sup>	7/04		
1989	6/20	6/19	8/09	8/15	7/12	7/12			<sup>a</sup>	7/20
1990	6/23	6/20	8/11	8/22	7/07	7/13	<sup>a</sup>	7/14		
1991	6/26	6/24	8/10	8/27	7/17	7/27			<sup>a</sup>	7/23
1992	7/08	7/15	8/12	8/12	7/08	7/14	<sup>a</sup>	7/13		
1993	6/26	6/28	8/17	8/25	7/10	7/30			<sup>a</sup>	7/14
1994	6/23	6/22	8/04	8/22	<sup>a</sup>	7/06	7/12	7/13		
1995	6/20	6/18	8/11	8/14	7/04	7/14			7/12	7/22
1996	6/20	6/15	8/05	8/05	<sup>a</sup>	7/11	7/11	7/15		
1997	6/19	6/27	8/07	8/12	<sup>a</sup>	7/18			<sup>a</sup>	7/23
1998	6/25	7/10	8/10	8/16	<sup>a</sup>	7/19	7/10	7/12		
1999	7/03	7/09	8/17	8/23	7/13	7/28			<sup>a</sup>	7/22
2000	6/26	6/24	8/07	8/17	<sup>a</sup>	7/18	7/06	7/07		
2001	7/06	7/04	8/10	8/14	<sup>a</sup>	7/09			<sup>a</sup>	7/21
2002	<sup>a</sup>	6/26	8/09	8/25	<sup>a</sup>	7/08	<sup>a</sup>	7/03		
2003	<sup>a</sup>	6/29	8/16	8/24	<sup>a</sup>	7/30			<sup>a</sup>	7/21
2004	<sup>a</sup>	7/01	8/12	8/15	<sup>a</sup>	7/17	<sup>a</sup>	7/07		
2005	6/28	6/23	8/10	8/19	<sup>a</sup>	7/10			<sup>a</sup>	7/16
2006	<sup>a</sup>	6/30	8/09	8/16	<sup>a</sup>	6/30	<sup>a</sup>	7/14		
2007	<sup>a</sup>	6/29	8/01	8/06	7/29	7/15			<sup>a</sup>	7/23
2008	<sup>a</sup>	7/07	8/10	8/13	7/30	7/18	7/12	7/17		
Average 1985-2001	6/29	6/27	8/10	8/17	7/19	7/18	7/07 <sup>b</sup>	7/11 <sup>c</sup>	<sup>d</sup>	7/20 <sup>e</sup>

<sup>a</sup> There were no directed openings, so cumulative proportion was not calculated.

<sup>b</sup> Pink salmon historical commercial even-year average is from 1994 to 2000.

<sup>c</sup> Pink salmon test fish historical even-year average is from 1986 to 2000.

<sup>d</sup> Odd year average unavailable due to a lack of directed pink salmon openings with the exception of 1995.

<sup>e</sup> Pink salmon test fish historical odd-year average is from 1985 to 2001.

Appendix A16.–Expanded daily and cumulative migration of all salmon species past the North River counting tower, Unalakleet River drainage, Norton Sound, 2005.

Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
17 Jun	0	0	0	0	0	0	0	
18 Jun	0	0	4	4	0	0	0	
19 Jun	0	0	4	8	0	0	0	
20 Jun	0	0	4	12	0	0	0	
21 Jun	0	0	13	25	0	0	0	
22 Jun	2	2	14	39	2	2	0	
23 Jun	2	4	8	47	-6	-4	0	
24 Jun	2	6	74	121	4	0	0	
25 Jun	10	16	104	225	46	46	0	
26 Jun	6	22	208	433	4	50	0	
27 Jun	58	80	1,174	1,607	8	58	0	
28 Jun	194	274	12,972	14,579	66	124	0	
29 Jun	358	632	94,454	109,033	90	214	0	
30 Jun	276	908	109,156	218,189	72	286	0	
1 Jul	1,084	1,992	81,462	299,651	24	310	0	
2 Jul	617	2,609	50,352	350,003	22	332	0	
3 Jul	236	2,845	55,306	405,309	30	362	0	
4 Jul	226	3,071	65,904	471,213	118	480	18	18
5 Jul	48	3,119	5,326	476,539	8	488	10	28
6 Jul	192	3,311	31,014	507,553	82	<b>570</b>	14	42
7 Jul	170	3,481	50,102	557,655	40	610	2	44
8 Jul	24	3,505	6,148	563,803	18	628	2	46
9 Jul	29	3,534	6,016	569,819	21	649	4	50
10 Jul	188	3,722	18,682	588,501	38	687	24	74
11 Jul	248	3,970	30,912	619,413	52	739	32	106
12 Jul	190	4,160	13,986	633,399	8	747	18	124
13 Jul	354	4,514	37,136	670,535	12	759	62	186
14 Jul	506	5,020	54,020	724,555	46	805	52	238
15 Jul	688	5,708	103,790	<b>828,345</b>	52	857	138	376
16 Jul	427	<b>6,135</b>	86,883	915,228	35	892	53	429
17 Jul	156	6,291	75,358	990,586	8	900	50	479
18 Jul	108	6,399	72,000	1,062,586	12	912	60	539
19 Jul	68	6,467	33,674	1,096,260	2	914	40	579
20 Jul	162	6,629	52,532	1,148,792	8	922	90	669
21 Jul	494	7,123	73,394	1,222,186	20	942	146	815
22 Jul	558	7,681	86,552	1,308,738	16	958	210	1,025
23 Jul	335	8,016	64,933	1,373,671	8	966	173	1,198
24 Jul	366	8,382	78,112	1,451,783	12	978	126	1,324
25 Jul	248	8,630	54,198	1,505,981	2	980	108	1,432

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Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
26 Jul	227	8,857	34,008	1,539,989	2	982	122	1,554
27 Jul	90	8,947	13,448	1,553,437	2	984	112	1,666
28 Jul	122	9,069	17,624	1,571,061	2	986	132	1,798
29 Jul	288	9,357	21,422	1,592,483	4	990	270	2,068
30 Jul	348	9,705	19,379	1,611,862	1	991	271	2,339
31 Jul	342	10,047	11,460	1,623,322	6	997	248	2,587
1 Aug	130	10,177	6,550	1,629,872	2	999	178	2,765
2 Aug	80	10,257	5,848	1,635,720	4	1,003	164	2,929
3 Aug	132	10,389	4,708	1,640,428	2	1,005	152	3,081
4 Aug	106	10,495	5,396	1,645,824	4	1,009	234	3,315
5 Aug	42	10,537	3,118	1,648,942	0	1,009	116	3,431
6 Aug	99	10,636	3,111	1,652,053	0	1,009	141	3,572
7 Aug	254	10,890	3,184	1,655,237	0	1,009	578	4,150
8 Aug	100	10,990	2,602	1,657,839	4	1,013	400	4,550
9 Aug	92	11,082	2,608	1,660,447	2	1,015	230	4,780
10 Aug	172	11,254	2,692	1,663,139	0	1,015	562	5,342
11 Aug	102	11,356	2,084	1,665,223	0	1,015	686	6,028
12 Aug	52	11,408	1,302	1,666,525	0	1,015	208	6,236
13 Aug	99	11,507	1,054	1,667,579	0	1,015	1,143	7,379
14 Aug	86	11,593	500	1,668,079	0	1,015	652	8,031
15 Aug	84	11,677	478	1,668,557		1,015	704	8,735
16 Aug	74	11,751	352	1,668,909		1,015	436	9,171
17 Aug	40	11,791	362	1,669,271		1,015	590	9,761
18 Aug	28	11,819	290	1,669,561		1,015	164	9,925
19 Aug	-14	11,805	392	1,669,953		1,015	76	10,001
20 Aug	25	11,830	299	1,670,252		1,015	685	10,686
21 Aug	48	11,878	188	1,670,440		1,015	2,296	12,982
22 Aug	50	11,928	136	1,670,576		1,015	846	13,828
23 Aug	-6	11,922	54	1,670,630		1,015	1,564	15,392
24 Aug	10	11,932	132	1,670,762		1,015	552	15,944
25 Aug	6	11,938	54	1,670,816		1,015	398	16,342
26 Aug	0	11,938	38	1,670,854		1,015	-6	16,336
27 Aug	4	11,942	3	1,670,857		1,015	16	16,352
28 Aug	4	11,946	20	1,670,877		1,015	4	16,356
29 Aug	6	11,952	18	1,670,895		1,015	220	16,576
30 Aug	14	11,966	8	1,670,903		1,015	102	16,678
31 Aug	2	11,968	22	1,670,925		1,015	62	16,740
1 Sep	-2	11,966	-8	1,670,917		1,015	-96	16,644
2 Sep	4	11,970	-2	1,670,915		1,015	48	16,692
3 Sep	6	11,976	-7	1,670,908		1,015	97	16,789
4 Sep	14	11,990	-2	1,670,906		1,015	226	17,015

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Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
5 Sep	4	11,994	4	1,670,910		1,015	290	17,305
6 Sep	-4	11,990	10	1,670,920		1,015	530	17,835
7 Sep	-4	11,986	-2	1,670,918		1,015	210	18,045
8 Sep	2	11,988	0	1,670,918		1,015	136	18,181
9 Sep	0	11,988	-8	1,670,910		1,015	268	18,449
10 Sep	-4	11,984	0	1,670,910		1,015	486	18,935
11 Sep	0	11,984	16	1,670,926		1,015	160	19,095
12 Sep	0	11,984	8	1,670,934		1,015	92	19,187
13 Sep	0	11,984	0	1,670,934		1,015	2	19,189
14 Sep	0	11,984	0	1,670,934		1,015	0	19,189
Total	11,984		1,670,934		1,015		19,189	

*Note:* The box within the column indicates the first to third quartiles of cumulative fish passage whereas the midpoint of the cumulative passage is indicated by the box with bold text.

Appendix A17.–Expanded daily and cumulative migration of all salmon species past the North River counting tower, Unalakleet River drainage, Norton Sound, 2006.

Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
18 Jun	2	2	0	0	0	0	0	0
19 Jun	-2	0	16	16	0	0	0	0
20 Jun	2	2	6	22	0	0	0	0
21 Jun	0	2	18	40	0	0	0	0
22 Jun	4	6	276	316	2	2	0	0
23 Jun	-2	4	228	544	0	2	0	0
24 Jun	0	4	172	716	1	3	0	0
25 Jun	8	12	1,248	1,964	8	11	0	0
26 Jun	68	80	8,734	10,698	8	19	0	0
27 Jun	116	196	20,018	30,716	24	43	0	0
28 Jun	14	210	13,806	44,522	4	47	0	0
29 Jun	-16	194	11,522	56,044	0	47	0	0
30 Jun	98	292	13,310	69,354	7	54	0	0
1 Jul	91	383	18,314	87,668	83	137	0	0
2 Jul	54	437	35,238	122,906	96	233	0	0
3 Jul	140	577	33,950	156,856	26	259	0	0
4 Jul	86	663	140,984	297,840	22	281	0	0
5 Jul	268	931	100,264	398,104	28	309	0	0
6 Jul	452	1,383	217,676	615,780	54	363	0	0
7 Jul	388	1,771	299,814	915,594	38	401	0	0
8 Jul	194	1,965	233,016	<b>1,148,610</b>	35	436	0	0
9 Jul	114	2,079	160,496	1,309,106	20	<b>456</b>	0	0
10 Jul	144	2,223	134,302	1,443,408	30	486	0	0
11 Jul	280	2,503	140,704	1,584,112	66	552	18	18
12 Jul	476	<b>2,979</b>	188,000	1,772,112	36	588	22	40
13 Jul	216	3,195	91,110	1,863,222	18	606	26	66
14 Jul	122	3,317	24,956	1,888,178	34	640	36	102
15 Jul	101	3,418	34,279	1,922,457	45	685	47	149
16 Jul	172	3,590	34,430	1,956,887	52	737	109	258
17 Jul	68	3,658	6,445	1,963,332	13	750	56	314
18 Jul	8	3,666	2,740	1,966,072	10	760	52	366
19 Jul	108	3,774	18,196	1,984,268	18	778	180	546
20 Jul	72	3,846	25,622	2,009,890	12	790	150	696
21 Jul	32	3,878	13,372	2,023,262	12	802	146	842
22 Jul	21	3,899	14,792	2,038,054	10	812	129	971
23 Jul	38	3,937	18,514	2,056,568	8	820	100	1,071
24 Jul	30	3,967	14,834	2,071,402	6	826	82	1,153
25 Jul	30	3,997	16,408	2,087,810	6	832	94	1,247
26 Jul	62	4,059	22,720	2,110,530	6	838	76	1,323

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Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
27 Jul	104	4,163	20,082	2,130,612	0	838	120	1,443
28 Jul	36	4,199	11,902	2,142,514	8	846	84	1,527
29 Jul	104	4,303	10,736	2,153,250	54	900	252	1,779
30 Jul	18	4,321	964	2,154,214	0	900	100	1,879
31 Jul	12	4,333	1,096	2,155,310	-4	896	82	1,961
1 Aug	16	4,349	1,228	2,156,538	-6	890	70	2,031
2 Aug	50	4,399	1,756	2,158,294	0	890	126	2,157
3 Aug	72	4,471	1,448	2,159,742	6	896	158	2,315
4 Aug	28	4,499	2,212	2,161,954	4	900	118	2,433
5 Aug	-2	4,497	1,784	2,163,738	0	900	162	2,595
6 Aug	16	4,513	1,164	2,164,902	8	908	234	2,829
7 Aug	12	4,525	764	2,165,666	-4	904	102	2,931
8 Aug	26	4,551	352	2,166,018	0	904	76	3,007
9 Aug	32	4,583	558	2,166,576	2	906	90	3,097
10 Aug	134	4,717	396	2,166,972	0	906	320	3,417
11 Aug	52	4,769	616	2,167,588	0	906	430	3,847
12 Aug	38	4,807	506	2,168,094	0	906	431	4,278
13 Aug	28	4,835	336	2,168,430	0	906	252	4,530
14 Aug	54	4,889	356	2,168,786	2	908	228	4,758
15 Aug	44	4,933	232	2,169,018	-2	906	208	<b>4,966</b>
16 Aug	124	5,057	160	2,169,178	2	908	204	5,170
17 Aug	54	5,111	182	2,169,360	0	908	276	5,446
18 Aug	72	5,183	102	2,169,462	0	908	452	5,898
19 Aug	-16	5,167	51	2,169,513	0	908	204	6,102
20 Aug	-20	5,147	46	2,169,559	0	908	8	6,110
21 Aug	8	5,155	58	2,169,617	0	908	70	6,180
22 Aug	26	5,181	12	2,169,629	0	908	108	6,288
23 Aug	74	5,255	46	2,169,675	0	908	470	6,758
24 Aug	28	5,283	62	2,169,737	0	908	328	7,086
25 Aug	6	5,289	48	2,169,785	0	908	150	7,236
26 Aug	20	5,309	3	2,169,788	0	908	129	7,365
27 Aug	8	5,317	34	2,169,822	0	908	144	7,509
28 Aug	0	5,317	24	2,169,846	0	908	76	7,585
29 Aug	-6	5,311	-6	2,169,840	-2	906	118	7,703
30 Aug	18	5,329	0	2,169,840	0	906	210	7,913
31 Aug	-4	5,325	22	2,169,862	0	906	110	8,023
1 Sep	8	5,333	-4	2,169,858	0	906	112	8,135
2 Sep	0	5,333	4	2,169,862	0	906	178	8,313
3 Sep	10	5,343	0	2,169,862	0	906	150	8,463
4 Sep	2	5,345	4	2,169,866	0	906	118	8,581

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Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
5 Sep	2	5,347	6	2,169,872	0	906	188	8,769
6 Sep	10	5,357	2	2,169,874	0	906	136	8,905
7 Sep	12	5,369	12	2,169,886	0	906	220	9,125
8 Sep	14	5,383	2	2,169,888	0	906	248	9,373
9 Sep	2	5,385	10	2,169,898	0	906	116	9,489
10 Sep	2	5,387	12	2,169,910	0	906	98	9,587
11 Sep	10	5,397	2	2,169,912	0	906	92	9,679
12 Sep	-12	5,385	-6	2,169,906	0	906	44	9,723
13 Sep	2	5,387	-6	2,169,900	0	906	28	9,751
14 Sep	-2	5,385	-4	2,169,896	0	906	70	9,821
15 Sep	0	5,385	-6	2,169,890	0	906	14	9,835
Total	5,385		2,169,890		906		9,835	

*Note:* The box within the column indicates the first to third quartiles of cumulative fish passage whereas the midpoint of the cumulative passage is indicated by the box with bold text.



Appendix A18.—Expanded daily and cumulative migration of all salmon species past the North River counting tower, Unalakleet River drainage, Norton Sound, 2007.

Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
16 Jun	12	12	0	0	0	0	0	0
17 Jun	0	12	0	0	0	0	0	0
18 Jun	0	12	0	0	0	0	0	0
19 Jun	0	12	-30	-30	0	0	0	0
20 Jun	6	18	0	-30	0	0	0	0
21 Jun	6	24	0	-30	0	0	0	0
22 Jun	-6	18	0	-30	0	0	0	0
23 Jun	0	18	0	-30	0	0	0	0
24 Jun	18	36	30	0	0	0	0	0
25 Jun	36	72	66	66	6	6	0	0
26 Jun	72	144	30	96	6	12	0	0
27 Jun	12	156	36	132	12	24	0	0
28 Jun	30	186	60	192	18	42	0	0
29 Jun	6	192	36	228	0	42	0	0
30 Jun	-6	186	42	270	0	42	0	0
1 Jul	12	198	66	336	18	60	0	0
2 Jul	30	228	144	480	30	90	0	0
3 Jul	72	300	270	750	30	120	0	0
4 Jul	222	522	4,338	5,088	42	162	0	0
5 Jul	198	720	9,654	14,742	108	270	0	0
6 Jul	60	780	12,426	27,168	90	360	0	0
7 Jul	144	924	20,802	47,970	96	456	6	6
8 Jul	42	966	11,742	59,712	102	558	42	48
9 Jul	54	1,020	15,774	75,486	54	612	12	60
10 Jul	84	1,104	14,592	90,078	174	786	24	84
11 Jul	24	1,128	15,462	105,540	72	858	48	132
12 Jul	72	1,200	19,524	125,064	126	<b>984</b>	132	264
13 Jul	270	1,470	16,740	141,804	162	1,146	102	366
14 Jul	576	2,046	41,382	183,186	150	1,296	102	468
15 Jul	66	2,112	4,878	188,064	78	1,374	42	510
16 Jul	96	2,208	4,434	192,498	42	1,416	18	528
17 Jul	42	2,250	3,696	196,194	0	1,416	12	540
18 Jul	138	2,388	6,966	203,160	12	1,428	138	678
19 Jul	198	2,586	23,010	226,170	18	1,446	90	768
20 Jul	96	2,682	14,706	240,876	36	1,482	66	834
21 Jul	210	2,892	27,378	268,254	54	1,536	96	930
22 Jul	336	3,228	32,280	<b>300,534</b>	84	1,620	348	1,278
23 Jul	222	3,450	30,684	331,218	18	1,638	228	1,506
24 Jul	288	3,738	27,582	358,800	18	1,656	516	2,022
25 Jul	414	<b>4,152</b>	43,026	401,826	120	1,776	726	2,748

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Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
26 Jul	438	4,590	38,046	439,872	84	1,860	582	3,330
27 Jul	216	4,806	34,662	474,534	18	1,878	540	3,870
28 Jul	216	5,022	16,338	490,872	18	1,896	294	4,164
29 Jul	264	5,286	17,526	508,398	12	1,908	276	4,440
30 Jul	216	5,502	15,126	523,524	6	1,914	606	5,046
31 Jul	210	5,712	8,358	531,882	0	1,914	366	5,412
1 Aug	144	5,856	9,738	541,620	6	1,920	438	5,850
2 Aug	96	5,952	8,790	550,410	18	1,938	576	6,426
3 Aug	138	6,090	6,600	557,010	0	1,938	738	7,164
4 Aug	195	6,285	7,797	564,807	0	1,938	1,101	8,265
5 Aug	60	6,345	5,454	570,261	0	1,938	900	9,165
6 Aug	30	6,375	1,998	572,259	0	1,938	1,140	<b>10,305</b>
7 Aug	26	6,401	1,432	573,691	0	1,938	542	10,847
8 Aug	33	6,434	1,584	575,275	2	1,940	674	11,521
9 Aug	29	6,462	951	576,225	2	1,942	476	11,997
10 Aug	18	6,480	18	576,243	6	1,948	552	12,549
11 Aug	39	6,519	39	576,282	0	1,948	477	13,026
12 Aug	12	6,531	12	576,294	0	1,948	648	13,674
13 Aug	52	6,583	246	576,540	0	1,948	385	14,059
14 Aug	44	6,626	255	576,795	0	1,948	409	14,468
15 Aug	44	6,671	244	577,038	0	1,948	409	14,877
16 Aug	44	6,715	244	577,282	0	1,948	409	15,286
17 Aug	33	6,748	210	577,492	0	1,948	345	15,631
18 Aug	17	6,765	189	577,680	0	1,948	311	15,942
19 Aug	0	6,765	180	577,860	0	1,948	288	16,230
20 Aug	126	6,891	414	578,274	0	1,948	402	16,632
21 Aug	168	7,059	354	578,628	0	1,948	408	17,040
22 Aug	60	7,119	552	579,180	0	1,948	384	17,424
23 Aug	78	7,197	258	579,438	0	1,948	204	17,628
24 Aug	132	7,329	336	579,774	0	1,948	156	17,784
25 Aug	141	7,470	342	580,116	0	1,948	219	18,003
26 Aug	30	7,500	216	580,332	0	1,948	150	18,153
27 Aug	108	7,608	96	580,428	0	1,948	270	18,423
28 Aug	198	7,806	114	580,542	0	1,948	228	18,651
29 Aug	18	7,824	120	580,662	0	1,948	198	18,849
30 Aug	48	7,872	30	580,692	0	1,948	96	18,945
31 Aug	66	7,938	78	580,770	0	1,948	150	19,095
1 Sep	51	7,989	63	580,833	0	1,948	102	19,197
2 Sep	42	8,031	66	580,899	0	1,948	264	19,461
3 Sep	72	8,103	12	580,911	0	1,948	174	19,635
4 Sep	30	8,133	12	580,923	0	1,948	198	19,833
5 Sep	18	8,151	6	580,929	0	1,948	132	19,965
Total	8,151		580,929		1,948		19,965	

Note: The box within the column indicates the first to third quartiles of cumulative fish passage whereas the midpoint of the cumulative passage is indicated by the box with bold text.

Appendix A19.—Expanded daily and cumulative migration of all salmon species past the North River counting tower, Unalakleet River drainage, Norton Sound, 2008.

Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
19 Jun	0	0	0	0	0	0	0	0
20 Jun	0	0	6	6	0	0	0	0
21 Jun	0	0	84	90	0	0	0	0
22 Jun	6	6	138	228	18	18	0	0
23 Jun	0	6	156	384	0	18	0	0
24 Jun	0	6	54	438	0	18	0	0
25 Jun	0	6	54	492	0	18	0	0
26 Jun	0	6	156	648	0	18	0	0
27 Jun	0	6	342	990	12	30	0	0
28 Jun	12	18	522	1,512	0	30	0	0
29 Jun	48	66	1,674	3,186	0	30	0	0
30 Jun	36	102	1,566	4,752	6	36	0	0
1 Jul	0	102	858	5,610	0	36	0	0
2 Jul	15	117	606	6,216	0	36	0	0
3 Jul	24	141	3,396	9,612	12	48	0	0
4 Jul	90	231	6,592	16,204	18	66	0	0
5 Jul	120	351	13,110	29,314	6	72	0	0
6 Jul	240	591	24,822	54,136	12	84	0	0
7 Jul	144	735	18,192	72,328	6	90	0	0
8 Jul	132	867	28,344	100,672	63	153	0	0
9 Jul	54	921	8,246	108,918	39	192	0	0
10 Jul	0	921	1,356	110,274	9	201	6	6
11 Jul	0	921	1,350	111,624	3	204	12	18
12 Jul	66	987	6,450	118,074	21	225	18	36
13 Jul	144	1,131	7,734	<b>125,808</b>	132	357	6	42
14 Jul	18	1,149	6,096	131,904	33	390	24	66
15 Jul	24	1,173	8,160	140,064	72	<b>462</b>	30	96
16 Jul	66	1,239	5,118	145,182	189	651	342	438
17 Jul	78	1,317	5,982	151,164	15	666	108	546
18 Jul	48	1,365	6,306	157,470	9	675	102	648
19 Jul	60	1,425	6,594	164,064	36	711	84	732
20 Jul	66	1,491	8,094	172,158	36	747	114	846
21 Jul	180	1,671	7,200	179,358	48	795	258	1,104
22 Jul	276	1,947	7,248	186,606	54	849	222	1,326
23 Jul	246	2,193	6,114	192,720	6	855	138	1,464
24 Jul	282	2,475	6,618	199,338	6	861	186	1,650
25 Jul	138	2,613	4,518	203,856	-18	843	246	1,896
26 Jul	186	2,799	4,116	207,972	30	873	186	2,082
27 Jul	264	3,063	3,336	211,308	0	873	192	2,274
28 Jul	12	3,075	2,514	213,822	0	873	180	2,454

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Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
29 Jul	66	3,141	2,664	216,486	6	879	174	2,628
30 Jul	192	3,333	2,110	218,596	12	891	264	2,892
31 Jul	582	3,915	3,210	221,806	24	915	888	3,780
1 Aug	156	4,071	1,998	223,804	6	921	180	3,960
2 Aug	174	4,245	2,262	226,066	0	921	270	4,230
3 Aug	36	4,281	1,920	227,986	0	921	204	4,434
4 Aug	132	4,413	1,338	229,324	0	921	270	4,704
5 Aug	12	4,425	1,758	231,082	0	921	72	4,776
6 Aug	294	4,719	2,124	233,206	0	921	396	5,172
7 Aug	240	<b>4,959</b>	1,374	234,580	0	921	288	5,460
8 Aug	120	5,079	1,092	235,672	6	927	378	5,838
9 Aug	327	5,406	666	236,338	0	927	246	6,084
10 Aug	246	5,652	864	237,202	-12	915	264	6,348
11 Aug	372	6,024	918	238,120	0	915	522	6,870
12 Aug	168	6,192	672	238,792	-12	903	354	7,224
13 Aug	156	6,348	432	239,224	0	903	276	7,500
14 Aug	252	6,600	282	239,506	0	903	252	7,752
15 Aug	219	6,819	288	239,794	0	903	288	<b>8,040</b>
16 Aug	288	7,107	210	240,004	0	903	390	8,430
17 Aug	144	7,251	72	240,076	0	903	378	8,808
18 Aug	294	7,545	0	240,076	0	903	1,074	9,882
19 Aug	168	7,713	30	240,106	0	903	414	10,296
20 Aug	60	7,773	48	240,154	0	903	246	10,542
21 Aug	96	7,869	24	240,178	0	903	288	10,830
22 Aug	126	7,995	6	240,184	0	903	390	11,220
23 Aug	96	8,091	60	240,244	0	903	375	11,595
24 Aug	18	8,109	42	240,286	0	903	54	11,649
25 Aug	342	8,451	0	240,286	0	903	510	12,159
26 Aug	204	8,655	0	240,286	0	903	330	12,489
27 Aug	150	8,805	0	240,286	0	903	186	12,675
28 Aug	24	8,829	6	240,292	0	903	318	12,993
29 Aug	138	8,967	-6	240,286	0	903	258	13,251
30 Aug	44	9,011	0	240,286	0	903	72	13,323
31 Aug	23	9,034	0	240,286	0	903	120	13,443
1 Sep	138	9,172	0	240,286	0	903	264	13,707
2 Sep	192	9,364	0	240,286	0	903	252	13,959
3 Sep	48	9,412	0	240,286	0	903	162	14,121
4 Sep	24	9,436	0	240,286	0	903	126	14,247
5 Sep	48	9,484	0	240,286	0	903	132	14,379
6 Sep	24	9,508	0	240,286	0	903	171	14,550

-continued-

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Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily Chinook	Cumulative Chinook	Daily Coho	Cumulative Coho
7 Sep	-6	9,502	0	240,286	0	903	120	14,670
8 Sep	-18	9,484	0	240,286	0	903	240	14,910
9 Sep	12	9,496	0	240,286	0	903	162	15,072
10 Sep	12	9,508	0	240,286	0	903	252	15,324
11 Sep	0	9,508	0	240,286	0	903	120	15,444
12 Sep	-6	9,502	0	240,286	0	903	96	15,540
13 Sep	0	9,502	0	240,286	0	903	108	15,648
Total	9,502		240,286		903		15,648	

*Note:* The box within the column indicates the first to third quartiles of cumulative fish passage whereas the midpoint of the cumulative passage is indicated by the box with bold text.



## **APPENDIX B: AGE, SEX, AND LENGTH**

Appendix B1.—Unalakleet River test fishery (5 7/8-inch mesh) annual Chinook salmon age, sex, and size composition (METF in mm), 1985–2008, Norton Sound.

Year	Sample Size <sup>a</sup>	Age Composition (Percent) <sup>b</sup>					Percent Female	Average Length		
		Age-4	Age-5	Age-6	Age-7	Age 5-6		Male	Female	Overall
1985	154	15.6	24.7	49.4	10.4	74.1	33.9	703	818	742
1986	47	2.1	38.3	31.9	27.7	70.2	51.0	746	865	806
1987	39	15.4	25.6	56.4	2.6	82.0	39.0	675	877	754
1988	14	35.7	57.1	7.1		64.2	13.3	727	815	738
1989	41	12.2	53.7	31.7	2.4	85.4	30.2	688	855	739
1990	40	27.5	45.0	22.5	5.0	67.5	45.2	666	681	673
1991	32	46.9	18.8	25.0	9.4	43.8	74.3	606	704	679
1992	61	45.9	16.4	36.1	1.6	52.5	38.8	701	726	711
1993	83	51.8	27.7	20.5		48.2	33.3	615	762	664
1994	32	6.3	71.9	18.8	3.1	90.7	54.3	697	794	750
1995	39	56.4	15.4	28.2		43.6	22.7	651	870	701
1996	115	7.7	78.6	12.4	0.9	91.0	56.5	690	710	705
1997	113	34.5	12.4	52.2	0.9	64.6	50.4	702	830	766
1998	74		20.3	68.9	10.9	89.2	67.6	726	764	752
1999	51	11.8	13.7	72.6	2.0	86.3	50.0	689	851	770
2000	41	4.9	51.2	34.2	9.7	85.4	37.8	722	797	750
2001	63	36.5	9.5	54.0		63.5	35.2	679	844	737
2002	42	19.0	69.1	7.1	4.8	76.2	7.0	685	852	697
2003	23	4.3	73.9	17.4	4.3	91.3	30.8	687	814	727
2004	23	8.7	47.8	30.4	13.0	78.2	36.7	663	826	720
2005	68	75.0	10.3	14.7		25.0	11.3	596	776	615
2006	66	65.2	31.8	3.0		34.8	3.8	625	783	631
2007	81	64.2	28.4	7.4		35.8	20.2	596	768	627
2008	97	16.5	73.2	10.3		83.5	23.6	662	788	692
1986-1992 Average	274	25.9	33.2	33.3	7.7	66.5	43.5	693	776	729
1993-1999 Average	509	24.2	35.2	38.3	2.4	73.5	49.4	675	781	727
2000-2006 Average	329	39.5	34.0	23.4	3.0	57.4	19.9	649	816	684

<sup>a</sup> Sample size indicates number of readable scale samples. Mean lengths and percentages include samples with unreadable scales.

<sup>b</sup> 4-year-old refers to age-1.2 fish; 5-year-old refers to age-1.3 and -2.2 fish; 6-year-old refers to age-1.4 and 2.3 fish; and 7-year-old refers to age-1.5 and -2.4 fish.



Appendix B2.—Annual Chinook salmon age, sex, and size composition (METF in mm) from the commercial and marine subsistence fisheries (8-inch mesh), 1985–2008, Unalakleet Subdistrict, Norton Sound.

Year <sup>a</sup>	Sample Size <sup>b</sup>	Age Composition (Percent)					Percent Female	Average Length		
		Age-4	Age-5	Age-6	Age-7	Age 5-6		Male	Female	Overall
1985	438	1.4	7.8	69.6	21.2	77.4	50.0	818	869	844
1986	467	2.1	18.6	50.3	29.1	68.9	50.0	826	875	851
1987	161	3.7	12.7	70.8	13.0	83.5	56.8	801	869	839
1988	298	7.7	30.2	56.7	5.4	86.9	47.3	740	846	790
1989	138	13.0	39.1	44.2	3.6	83.3	40.7	738	838	778
1990	140	9.3	30.0	60.0	1.0	90.0	44.0	753	799	773
1991	159	27.0	34.6	37.1	1.9	71.7	47.0	697	788	740
1992	29	44.8	27.6	20.7	6.9	48.3	46.4	636	734	683
1993	139	27.3	27.3	41.7	3.6	69.0	39.6	694	828	747
1994	270	1.3	61.5	36.8		98.3	50.0	770	837	804
1995	230	14.8	13.4	70.4	1.3	83.8	47.2	756	859	814
1996	127	6.2	46.5	41.0	6.3	87.5	38.5	759	839	790
1997	149	30.9	14.1	53.7	1.4	67.8	46.7	707	860	778
1998	136		27.2	58.2	14.8	85.4	39.9	765	804	780
1999	139	3.0	9.4	82.0	5.8	91.4	57.3	769	873	829
2000	102		48.0	41.2	10.8	89.2	34.2	771	813	785
2001	57	31.6	3.5	59.7	5.3	63.2	53.8	634	892	773
2002	No commercial fishery occurred and no samples were collected from the subsistence fishery.									
2003										
2004										
2005	44	9.1	13.6	72.8	4.5	86.4	No sex or length data collected in 2005.			
2006	No samples collected from the subsistence fishery.									
2007	176	17.6	26.7	54.0	1.7	80.7	52.0	721	824	774
2008	98		80.0	20.0		100.0	43.0	740	786	760
1985-1991 Average	2,075	6.6	21.2	56.9	15.2	78.1	49.0	780	853	816
1992-1998 Average	1,049	13.5	32.6	50.0	3.8	82.6	44.7	743	843	787
1999-2007 Average	405	13.8	27.1	52.9	6.2	80.0	47.0	727	834	777

<sup>a</sup> Samples from 1985 to 2001 and 2005 were collected from the commercial harvest and 2007 to 2008 samples were collected from marine subsistence fishery.

<sup>b</sup> Sample size indicates number of readable scale samples. Mean lengths and percentages by sex include samples within readable scales.

Appendix B3.—Unalakleet River test fishery (5 7/8-inch mesh) annual chum salmon age and sex composition, 1985–2008, Norton Sound.

Year	Sample Size <sup>a</sup>	Percent by Sex		Percent by (Age Group)				
		Male	Female	(0.2)	(0.3)	(0.4)	(0.5)	(0.6)
1985	811	61	39	0.3	34.3	63.5	1.9	
1986	760	63	37	0.5	46.6	50.7	2.2	
1987	607	65	35	0.8	50.6	44.0	4.6	
1988	465	59	41	1.0	59.0	38.0	2.0	
1989	727	61	39	0.2	47.7	50.6	1.5	
1990	321	43	57	2.5	41.4	53.6	2.5	
1991	738	51	49	0.1	70.3	29.0	0.5	
1992	562	60	40		10.3	84.7	5.0	
1993	324	66	34	36.7	49.4	13.6	0.3	
1994	475	64	35	0.2	30.7	63.2	5.9	
1995	502	67	33	24.2	63.8	12.0		
1996	503	61	39	0.4	19.6	51.5	27.2	1.2
1997	285	63	38	0.4	26.0	67.4	5.3	1.1
1998	183	72	28	1.6	59.6	32.8	6.0	
1999	339	28	72		58.4	40.4	1.2	
2000	496	28	72	0.2	29.0	68.3	2.4	
2001	260	28	72	7.3	40.8	49.6	2.3	
2002	756	70	30	1.5	48.9	43.9	5.7	
2003	391	81	19	0.5	83.1	13.8	2.6	
2004	920	77	23	2.8	30.2	66.8	0.1	
2005	1,069	78	22	0.5	75.0	22.2	2.2	0.1
2006	1,443	75	25	0.4	26.1	72.3	1.2	
2007	914	80	20	1.0	50.0	42.9	6.9	0.1
2008	456	76	24		32.2	58.8	8.8	0.2

<sup>a</sup> Sample sizes indicate the number of samples with readable scales.

Appendix B4.—Commercial fishery annual chum salmon age and sex composition, 1985–2008, Unalakleet Subdistrict, Norton Sound.

Year	Sample Size <sup>a</sup>	Percent by Sex		Percent by (Age Group)				
		Male	Female	(0.2)	(0.3)	(0.4)	(0.5)	(0.6)
1985	1,354	52.1	47.9		43.6	54.6	1.7	0.1
1986	1,352	56.8	43.2	0.3	46.8	50.4	2.6	
1987	603	49.6	50.4	0.9	45.4	50.7	3.0	
1988	1,506	53.6	46.4	1.0	60.0	37.0	2.0	0.1
1989	445	54.0	46.0		55.6	44.2	0.2	
1990	453	42.4	57.6	1.5	48.1	48.1	2.2	
1991	463	52.3	47.7		66.3	33.3	0.4	
1992	429	49.0	51.0	0.5	11.2	84.4	4.0	
1993	441	50.3	49.7		35.6	52.6	11.3	
1994	437	50.1	49.9	0.5	54.0	43.2	2.5	
1995	199	49.2	50.8		30.7	57.8	11.1	
1996	152	75.7	24.3	0.2	23.7	56.6	17.1	2.6
1997	250	58.4	41.6	1.1	30.8	63.6	4.8	
1998	186	47.8	52.2	1.1	67.2	31.2	0.5	
1999	288	52.2	47.8	1.0	63.9	34.0	1.0	
2000	293	52.2	47.8	0.3	49.8	49.5	0.3	
2001	356	49.2	50.8	0.6	36.0	59.6	3.9	
2002	189	45.5	54.5	4.8	64.6	28.0	2.6	
2003	235	45.5	54.5		93.2	6.8		
2004	286	57.3	42.7	7.7	31.5	60.8		
2005	234	52.1	47.9	4.3	85.0	9.0	1.7	
2006	578	54.0	46.0	2.4	42.4	55.2	0.7	
2007	301	62.8	37.2		62.5	31.9	5.6	
2008	192	51.0	49.0		48.4	44.8	6.8	

<sup>a</sup> Sample sizes indicate the number of samples with readable scales.

Appendix B5.—Unalakleet River test fishery (5 7/8-inch mesh) annual coho salmon age and sex composition, 1985–2008, Norton Sound.

Year	Sample Size <sup>a</sup>	Percent by Sex		Percent by (Age Group)		
		Male	Female	(1.1)	(2.1)	(3.1)
1985	183	51.9	48.1	16.6	79.8	3.6
1986	128	54.7	45.2		93.0	7.0
1987	119	46.2	53.8	16.0	64.7	19.3
1988	141	82.0	59.0		93.0	7.0
1989	142	46.5	53.5	0.7	96.5	2.8
1990	238	51.7	48.3		89.9	10.1
1991	167	49.0	51.0	22.2	73.0	4.8
1992	253	56.9	43.1	27.7	65.6	6.7
1993	116	51.7	48.3	17.2	81.9	0.9
1994	183	60.7	39.3	17.5	78.7	3.8
1995	77	47.4	52.6	14.5	76.3	9.2
1996	174	59.2	40.8	10.9	86.8	2.3
1997	73	52.1	47.9	13.7	80.8	5.5
1998	116	37.9	62.1		95.7	4.3
1999	103	66.0	34.0		92.2	7.8
2000	169	61.5	38.5		97.6	2.4
2001	164	53.7	46.3	4.3	82.3	13.4
2002	327	50.5	49.5	12.8	74.0	13.1
2003	213	47.4	52.6	15.5	78.4	6.1
2004	527	56.2	43.8	12.7	82.9	4.4
2005	776	53.7	46.3	15.2	82.0	2.8
2006	1,188	62.5	37.5	35.3	60.9	3.8
2007	619	60.6	39.4	19.5	78.2	2.3
2008	231	67.7	32.3	20.8	72.3	6.9

<sup>a</sup> Sample sizes indicate the number of samples with readable scales.

Appendix B6.—Commercial fishery annual coho salmon age and sex composition, 1985–2008, Unalakleet Subdistrict, Norton Sound.

Year	Sample Size <sup>a</sup>	Percent by Sex		Percent by (Age Group)		
		Male	Female	(1.1)	(2.1)	(3.1)
1985	334	62.0	38.0	17.3	77.4	5.3
1986	223	59.6	40.3	0.4	93.3	6.3
1987	278	48.9	51.1	8.2	64.4	27.4
1988	248	55.0	45.0		94.0	6.0
1989	156	54.5	45.5		91.0	9.0
1990	297	55.5	44.5	2.0	92.3	5.0
1991	143	50.3	49.7	4.9	89.5	5.6
1992	181	50.8	49.2	19.3	70.2	10.5
1993	123	60.2	39.8	12.2	84.6	3.3
1994	258	50.4	49.6	22.5	72.1	5.4
1995	176	54.0	46.0	4.0	76.1	19.9
1996	150	38.7	61.3	3.3	92.0	4.7
1997	134	46.3	53.7	10.4	85.8	3.7
1998	144	52.1	47.9	0.7	87.5	11.9
1999	186	43.1	56.9		94.1	5.9
2000	131	62.6	37.4		96.9	3.1
2001	199	54.8	45.2	4.0	63.8	32.2
2002	367	59.7	40.3	3.8	84.7	11.5
2003	687	44.3	55.7	11.5	79.0	9.5
2004	321	64.5	35.5	5.6	90.0	4.4
2005	540	50.7	49.3	11.5	86.3	2.2
2006	1,001	52.7	47.3	38.5	57.1	4.4
2007	769	48.4	51.6	20.7	77.0	2.3
2008	154	53.4	46.6	22.7	64.9	12.3

<sup>a</sup> Sample sizes indicate the number of samples with readable scales.